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AN INTRODUCTION TO THE STUDY OF
MAN AND CIVILIZATION

VOL. II

BY

SIR EDWARD B. TYLOR, KT.,

D.C.L., LL.D., F.R.S.

WITH ILLUSTRATIONS

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CHAPTER X

ARTS OF LIFE—(*continued*)

Dwellings :—Caves, 1—Huts, 2—Tents, 2—Houses, 3—Stone and Brick Building, 3—Arch, 5—Development of Architecture, 6. Dress :—Painting skin, 6—Tattooing, 7—Deformation of Skull, &c., 9—Ornaments, 11—Clothing of Bark, Skin, &c., 12—Mats, 14—Spinning, Weaving, 14—Sewing, 16—Garments, 17. Navigation :—Floats, 19—Boats, 19—Rafts 21—Outriggers, 21—Paddles and Oars, 22—Sails, 22—Galleys and Ships, 23

We have next to examine the dwellings of mankind. Thinking of the nests of birds, the dams of beavers, the tree-platforms of apes, it can scarcely be supposed that man at any time was unable to build himself a shelter. That he does not always do so is mostly because while on the move from place to place he may be content to sleep in the open, or take to the natural shelter of a tree or rock. Therefore, though evidence happens to remain of ancient savage races having dwelt much in natural sheltering-places, it must not be thence inferred that these rough folk, even the contemporaries of the mammoth, were too helpless to build themselves huts when it suited them. Rock-shelters under the cliffs were in Europe the resort of the ancient savages, as is proved by the bones and flint flakes and other remains that are found lying there in the ground. Caves are ready-made houses for beast or man. It has been already mentioned (vol. i. p. 24) how, in such countries as England and France, caverns were the abodes of the old tribes of the reindeer and mammoth period, and the Bushmen of South Africa are a modern example of rude tribes thus given to dwelling in caves in the rocks. But caverns are so convenient that they are now and then still used in the civilized world, and most of us have seen some cave in a cliff forming the back of a fisherman's cottage, or at least a storehouse. It is not so much with these natural dwellings that we are here concerned as with artificial structures, however rude, set up by man for his shelter.

In the depths of Brazilian forests, travellers have come

upon the dwellings of the naked Puris, which are not even huts, only sloping screens made by setting up a row of huge palm-leaves some eight feet long, leaning against a cross-pole. Being put up to windward, this shelters the lazy Indian as he lolls in his hammock slung between two trees, and with the dense foliage overhead life is not comfortless on fine days, though in bad weather the family and dogs have to crouch defenceless round the wood fire on the ground. Even in these tropical forests, what is generally met with is a real hut, though it may be such a rude one as the Botocudos make with these same great palm-leaves, sticking a number of them with their stalks in the ground in a circle, and bringing their points together, so as to form a roof overhead. The Patachos go to work more artificially, bending together young growing trees and poles stuck in the ground, so that by binding their tops together they form a framework which is then thatched over with large leaves. Much the same lesson in primitive architecture may be learnt from the natives of Australia, among whom a party camping out will be content to set up a line of leafy boughs in the ground to form a screen or break-wind for the night; but when they take the pains to interlace such boughs overhead, the screen becomes a hut, and where they stay for a while they will make a regular framework of branches, covering them in with sheets of bark, or leaves and grass, and even laying on sods or daubing the outside with clay. The invention of the simple round hut is thus easily understood. It is plain, too, how a conical hut, when roving tribes like the American Indians carry from place to place its poles and skins or sheets of bark, becomes in fact a portable tent, and this shows how tents came to be invented. The more cultured herdsmen of the East carry for their tent-coverings sheets of felted hair or wool, and we ourselves use for temporary shelter tents of canvas. Indeed one has only to look at the common bell-tent of the soldier to see that it is a transformed savage hut. Now the circular hut, whether beehive or conical, is low to creep into and small to lie or crouch in. More room is often got by digging the earth out some feet deep within, but a greater improvement in construction is to raise the hut itself on posts or a wall, so that what was at first the whole house now becomes the roof. Thus is built the round hut with its side-posts filled in with wattle and mud, or its solid earthen wall carrying the thatched roof

which may reach beyond in shady eaves. Such were in ancient times common peasants' dwellings in Europe, as they still are in other quarters of the world, and indeed we perhaps keep up a memory of them in the round thatched summer-houses in our gardens, which are curiously like the real huts of barbarians. Next, as African travellers remark, one great sign of higher civilization is when people begin to build their houses square-cornered instead of round. The circular hut to be easily built must be small, and room is best gained by building the house oblong, with a ridge pole along the roof where the sloping poles from the sides meet. By being able to build to any required length, it became possible for many families, often twenty, to live together in village-houses as rude peoples often do. In barbaric countries spacious houses are built with the roofs carried on lofty posts with cross-timbers, or on solid walls of earth or stones; in fact they are constructed on much the same principles as our modern houses, though more rudely.

It does not seem difficult to make out how stone and brick architecture came into use. Where wood is scarce, men readily take to building walls of stone, turf, or earth. Thus the Australians are known to build shelters by heaping up loose stones as a wall, and roofing with sticks laid across. Rough stones, though they make good embankments and low walls, would be too unsteady for high walls, except slaty and stratified slabs which form natural building-stones. With mere stones out of the ground dwellings would hardly be built of a higher kind than the curious beehive-houses of the Hebrides, whose small rudely vaulted chambers are formed by the piled stones overlapping inwards till they almost meet above, and covered in with growing turf, so that they look like grassy hillocks with passages for the dwellers to creep in. This primitive building is very ancient, and though such houses are no longer made the old ones still serve as shealings in summer. The ancient Scotch underground dwellings or "weems," (*i.e.* caves) have chambers of rough stones, and remind antiquaries of Tacitus' account of the caves dug by the ancient Germans and heaped over with dirt, where they stored their grain and took refuge themselves from the cold, and in time of war from the enemy. When the craft of the mason is brought in, buildings of a higher order begin. The stones may at first be merely trimmed to fit one another like the

pieces of a mosaic, as in the so-called Cyclopean stone-work of old Etruscan and Roman walls. But the world soon adopts a higher way, not arranging the plan to suit the stones, but shaping the stones to fit the work, especially using rectangular blocks of stone to lay down in regular courses of masonry. In ancient Egypt, the masons hewed and smoothed even granite and porphyry to a finish which is envied by the architects of our own day, and the pyramids of Gizeh are as wonderful for the fine masonry of their slopes, chambers, and passages, as for their prodigious size. Our modern notion of a stone building is that the blocks of stone are to be fixed together with a layer of mortar to bind them, but in the old and beautiful architecture of Egypt and Greece the faced stone blocks lie on one another, having no cement to hold them, and needing none. Clamps of metal were used when required to hold the stones together. Cement or mortar (so called from the mortar or trough in which it was mixed) was also well known in the ancient world. The Roman builders not only used the common lime-and-sand mortar, which hardens by absorbing carbonic acid from the air, but they also knew how by adding volcanic ash or pozzolana to make a water-resisting cement, whence the name of " Roman cement " given to a composition used by our masons. Mention has been already made of the practice of coating the sides of the savage bough-hut with clay. The ancient people who built their settlements on piles out in the Swiss lakes used to do this, as is proved by bits of the clay coating which were accidentally baked when the huts were burnt down, and fell into the water, where they may still be found, showing the impressions of the long-perished reed cabins on which the moist clay was plastered. We still have something of the kind in what cottage-builders call " wattle and daub." One also sees now and then in an English country lane a cottage or cowhouse which is a relic of another sort of primitive architecture, its walls being simply built of " cob," that is, clay mixed with straw. Such hut-walls of clay or mud are very usual in dry climates such as Egypt, where they are cheaper and better than timber. This being so, there is no difficulty in understanding how sun-dried bricks came into use, these being simply convenient blocks of the same mud or loam mixed with straw which was used to build the cottage walls. These sun-dried bricks were used in the East from high antiquity. Some of the

Egyptian pyramids still standing are built of them, and the pictures show how the clay was tempered and the large bricks formed in wooden moulds much as in modern brickfields. With these the architects of Nineveh built the palace walls ten or fifteen feet thick, which were panelled with the slabs of sculptured alabaster. For such sun-dried bricks, clay and water form a sufficient cement. Building with mud-bricks, which indeed suits the climate well, goes on in these countries as of old. They were used also in America, and to this day the traveller in such districts as Mexico will often find himself lodged in a house built of them, and wondering whether he may account by Spanish-Moorish influence for its being like an Eastern caravanserai, or whether mud-brick villages came by natural invention to be so alike on both sides of the world. Baked bricks seem to have been a later invention, easy enough to nations who baked earthen pots, but only wanted in more rainy climates. Thus the Romans, whom mere mud-bricks would not have suited, carried to great perfection the making of kiln-burnt bricks and tiles.

For ordinary house-building, we now have recourse to the mason or bricklayer to build the walls, and tiles or slates are an improvement on the old thatch. But we so far keep to the old wooden architecture, that the floors and the timbering of the roof are still wood-work. For tombs and temples, however, built to last for ages, means were early wanted of roofing over spaces with the bricks or stones themselves without trusting to wooden beams. There are two modes of doing this, the false arch and the real arch, which are both ancient. The false arch is an arrangement which would occur to any builder, in fact it is what children make in building with wooden bricks, when they set them overlapping more and more till the top ones come near enough for one brick to cover the gap. Passages and chambers roofed in like this with projecting blocks of stone may be seen in the pyramids of Egypt, in ancient tombs of Greece and Italy, in the ruined palaces of Central America; and thus are built the domes of the Jain temples in India. It does not follow that the architects were ignorant of the real arch; they may have objected to it from its tendency to thrust the walls out. It is not known exactly how and when the arch was invented, but the idea might present itself even in roofing over doorways with rough stones. In the tombs of ancient Egypt real arches are to be seen, con-

structed in mud-bricks, or later in stone, by architects who quite understood the principle. Yet though the arch was known in what we call ancient times, it was not at once accepted by the world. It is remarkable that the Greek architects of the classic period never took to it. It was left to the Romans, who applied it with admirable skill, and from whose vaulted roofs, bridges, and domes, those of the mediæval and modern world are derived.

In thus looking over the architecture of the world, we see that its origins lie too far back for history to record its beginning and earliest progress. Still there is reason to believe that, in architecture as in other arts, man began with the simple and easy before he came on to the complex and difficult. There are many signs of stone architecture having grown out of an earlier wooden architecture. Thus, on looking at the Lykian tombs in the entrance-hall of the British Museum, it will be seen that though they are of hewn stone their forms are copied from wooden beams and joists, so that the mason shows by his very patterns that he has taken the place of an earlier carpenter. Even in the early stone-work of Egypt, traces of wooden forms are to be seen. In India there are stone buildings whose columns and architraves are not less plainly copied from wooden posts and horizontal beams resting on them. It is possible that, when men first took to setting up stone columns and supporting stone blocks upon them, this idea may have come into their minds from the wooden posts and beams they had been used to. But when it is said, as it often has been, that the porticos of Greek temples are copies in stone of older wooden structures, practical architects object that the Parthenon is not really like carpenter's work. Indeed it is known that the Greeks did not invent their own column-architecture, but, taking the idea of it from what they saw in Egypt and other countries, carried it out according to their own genius.

After dwellings, we come to examine clothing. It has first to be noticed that some low tribes, especially in the tropical forests of South America, have been found by travellers living quite naked. But even among the rudest of our race, and in hot districts where clothing is of least practical use, something is generally worn, either from ideas of decency or for ornament. Where little or no clothing is worn, it is common to paint the body. The Andaman islanders, who plaster themselves with a

mixture of lard and coloured earth, have a practical reason for so doing, this coat of paint protecting their skin from heat and mosquitos; but they go off into love of display when they proceed to draw lines on the paint with their fingers, or when a dandy will colour one side of his face red and the other olive-green, and make an ornamental border-line where the two colours meet down his chest and stomach. Among the relics of the ancient cave-men of Europe are hollowed stones, which were their primitive mortars for grinding the ochre and other colours for painting themselves. Indeed, few habits mark the lower stages of human life so well as the delight in body-patterns of bold spots and stripes in striking colours, familiar to us in pictures of Australians dancing at a corroboree, or Americans working themselves up to frenzy in the scalp-dance. The primitive sign of mourning also makes its appearance where savage mourners blacken (or whiten) themselves over. In the higher civilization, faded beauties may still make a poor attempt to revive youthful bloom with touches of red and white. But the ancient war-paint is now looked down on as a sign of utter barbarism; so much so that the ancient Britons, though a nation of considerable civilization, have been treated by many historians as mere savages because they kept up this rude practice, as Cæsar says, staining themselves blue with woad, and so being of horrider aspect in war. Among ourselves the guise which was so terrific in the Red Indian warrior has come down to make the circus-clown a pattern of folly. It is very likely that his paint-striped face may represent a fashion come down from the ancient times when paint was worn by the barbarians of Europe, much as certain figures used in Chinese ritual have paint-streaked faces, doubtless keeping up what was once an ordinary decoration. When the skin is tattooed, the chief purpose of this is no doubt beauty, as where the New Zealander had himself covered with patterns of curved lines such as he would adorn his club or his canoe with; it was considered shameful for a woman not to have her mouth tattooed, for people would say with disgust "she has red lips." Tattooing prevails as widely among the lower races of the world as painting, and the fashionable designs range from a few blue lines on the face or arms, up to the flower-patterns with which the skins of the Formosans are covered like damask. Where the art is carried to perfection, as in Polynesia, the skin

is punctured, and the charcoal-colour introduced, by tapping rows of little prickers. But a rougher mode is common, as in Australia or Africa, where gashes are made and wood-ashes rubbed in so that the wound heals in a knob or a ridge. Marks on the skin often serve other purposes than ornament, as in Africa, where a long scar on a man's thigh may mean that he has done valiantly in battle, or the tribe or nation a negro belongs to may be indicated by his mark; for instance, a pair of long cuts down both cheeks, or a row of raised pimples down his forehead to the tip of his nose. Higher up in civilization, tattooing still lasts on, as where Arab women will slightly touch up their faces, arms, or ankles with the needle, and our sailors amuse themselves with having an anchor or a ship in full sail done with gunpowder on their arms; but in this last case the original purpose is lost, for the picture is hidden under the sleeve. Naturally, as clothing comes more and more to cover the body, the primitive skin-decorations cease, for what is the use of adorning oneself out of sight?

The head is frequently cropped or shaved close as a sign of mourning. Some thus go bald always, as among the Andaman islanders; or let the hair grow in tonsure-fashion in a ring round the shaved crown, like the Coroado (that is, "crowned") Indians of Brazil; or wear a shaven head with a long scalp-lock or pigtail like the North American Indians, or the Manchus of Tartary, from whom the modern Chinese have adopted this habit. A curious mode of twisting the hair with strips of bark into hundreds of long thin ringlets is seen in the portraits of natives of Lepers' Island, Fig. 66.

Various tribes grind their front teeth to points, or cut them away in angular patterns, so that in Africa and elsewhere a man's tribe is often known by the cut of his teeth. Long finger-nails are noticed even among ourselves as showing that the owner does no manual labour, and in China and neighbouring countries they are allowed to grow to a monstrous length as a symbol of nobility, ladies wearing silver cases to protect them, or at least as a pretence that they are there (see the portraits of Siamese actresses in royal dress, Fig. 32). Or the nails may be let to grow as a sign that the wearer leads a religious life, and does no worldly work, as in the accompanying figure of the hand of a Chinese ascetic, Fig. 67.

As any nation's idea of beauty is apt to be according to the type of their own race, they like to see their distinc-

tive features exaggerated. Looking at a Hottentot face, Fig. 12 *c*, one understands why the mothers would squeeze the babies' snub noses yet further in, while in ancient times a little Persian prince would have a bold

Fig. 66.—Natives of Lepers' Island (New Hebrides).

aquiline nose shaped for him, to come like Fig. 11 *b*. In all quarters of the globe is found the custom of compressing infants' heads by bandages and pads to make the little plastic skull grow to an approved shape. But as to what that shape ought to be, tastes differ extremely. In the

Columbia River district, some Flathead tribes will so flatten out the forehead that the front faces look like a pear with the large end uppermost, while neighbouring tribes press in the upper part of the skull so that their faces look like the pear with the small end up. Hippokrates, the ancient physician, mentions the artificially deformed skulls of the Makrokephali or "long-heads"

FIG. 67.—Hand of Chinese ascetic.

of the Black Sea district. The genuine Turkish skull is of the broad Tatar form, while the nations of Greece and Asia Minor have oval skulls, which gives the reason why at Constantinople it became the fashion to mould the babies' skulls round, so that they grew up with the broad head of the conquering race. Relics of such barbarism linger on in the midst of civilization, and not long ago a French physician surprised the world by the fact that nurses in Normandy were still giving the children's heads a sugar-loaf shape by bandages and a

tight cap, while in Brittany they preferred to press it round. No doubt they are doing so to this day.

The propensity to beautify the body with ornaments belongs to human nature as low down as we can follow it. In South America the naked people were adorned with rings on legs and arms, and one tribe had as their only apparel a macaw's feather stuck in a hole at each corner of their mouths, and strings of shells hanging from their noses, ears, and under-lips. This latter case is a good example of the ornaments being fastened into the body, which is pierced or cut to receive them. Various tribes wear labrets or lip-ornaments, some gradually enlarging

FIG. 68.—Botocudo woman with lip- and ear-ornaments.

the hole through the under-lip till it will take a wooden plug two or three inches across, as in the portrait (Fig. 68) of a woman of the Botocudos, a Brazilian tribe who owe their name to this labret, which the Portuguese compared to a *botoque* or bung. Ear-ornaments, as the figure shows, are put in the same way in the lobe of the ear, which they stretch so that when the disc of wood is taken out it falls in a loop and even reaches the shoulder. Thus it is possible that there may be some truth in the favourite wonder-tale of the old geographers, about the tribes whose great ears reached down to their shoulders, though the story had to be stretched a good deal farther when it was declared that they lay down on one ear and covered themselves with the other for a blanket. The

great interest to us in these savage ornaments is in the tendency of higher civilization to give them up. In Persia one still finds the nose-ring through one side of a woman's nostril, but European taste would be shocked by this, though it allows the ear to be pierced to carry an ear-ring. As to ornaments which are merely put on, they are mostly feathers, flowers, or trinkets worn in the hair, or strung-ornaments or rings on the neck, arms, and legs. In what remote times man had begun to take pleasure in such decorations may be seen by the periwinkle-shells bored for stringing found in the cave of Cro-Magnon, which no doubt made necklaces and bracelets for the girls of the mammoth-period. In the modern world necklaces and bracelets remain in unchanged use, though anklets, such as the bangles of the Hindu dancing-girl, have of course disappeared from the costume of civilized wearers of shoes and stockings. It would not suit our customs to keep an affectionate memory of dead relatives by wearing their finger and toe bones strung as beads, as the Andaman women do, but our ladies keep in fashion barbaric necklaces of such things as shells, seeds, tigers' claws, and especially polished stones. The wearing of shining stones as ornaments lasts on, whether they have come to be precious pearls or rubies, or glass beads which are imitation stones. Where metal becomes known it at once comes into use for ornament, and this reaches its height where amused travellers describe some Dayak girl with her arms sheathed in a coil of stout brass wire, or some African belle whose great copper rings on her limbs get so hot in the sun that an attendant carries a water-pot to sluice them down now and then. To see gold jewelry of the highest order, the student should examine that of the ancients, such as the Egyptian, Greek, and Etruscan in the British Museum, and that of mediæval Europe. The art seems now to have passed its prime, and become a manufacture, of which the best products are imitations from the antique. The cutting of precious stones such as diamonds into facets is, however, a modern art. As to finger-rings, if their use arose out of the signet rings of Egypt and Babylon, then the few which are still engraved as seals keep up the original idea, while those which only carry pearls or diamonds have turned into mere ornaments.

To come now to clothing proper. The man who wants a garment gets it in the simplest way when he takes the covering off a tree or a beast, and puts it on himself.

The bark of trees provides clothes for rude races in many districts, as for instance in the curious use which natives of the Brazilian forests have long made of the so-called "shirt-tree" (lecythis). A man cuts a four or five feet length of the trunk, or a large branch, and gets the bark off in an entire tube, which he has then only to soak and beat soft and to cut slits for armholes, to be able to slip it on as a ready-made shirt; or a short length will make a woman's skirt. The wearing of bark has sometimes been kept up as a sign of primitive simplicity. Thus in India it is written in the laws of Manu that when the grey-haired Brahman retires into the forest to end his days in religious meditation, he shall wear a skin or a garment of bark. A ruder people, the Kayans of Borneo, while in common life they like the smart foreign stuffs of the trader, when they go into mourning throw them off and return to the rude native garment of bark-cloth. In Polynesia the manufacture of *tapa* from the bark of the paper-mulberry was carried to great perfection, the women beating it out with grooved clubs into a sort of vegetable felt, and ornamenting it with coloured patterns rubbed on. The people were delighted with the white paper of the Europeans, and dressed themselves in it as a fine variety of tapa, till they found that the first shower of rain spoilt it. Leaves, also, are made into aprons or skirts which clothe various rude tribes. Not only are there "leaf-wearers" in India, but at a yearly festival in Madras the whole low-caste population cast off their ordinary clothing, and put on aprons of leafy twigs.

The skin garments worn by the savages of the ancient world have rotted away these many thousand years, but we may see how generally they used to be worn by the vast numbers of skin-dressing implements of sharp stone (see Fig. 54 *c*) found in the ground. Till lately the Patagonians, when they came on their journeys to a place where suitable flint or obsidian was to be found, would load themselves with a supply of lumps to chip into these primitive currier's scrapers. Savages, that their fur robes or deer-skin shirts should not dry stiff, know how to dress the leather skilfully by such processes as rubbing in fat or marrow, and suppling with the hands; they also smoke it, to keep. Thus the North Americans know how to prepare deer-skin for garments into something like what we call chamois leather. But it hardly seems as though the lower races had taught

themselves the process of actual tanning with bark or galls, where the tannic acid forms in the substance of the skin insoluble compounds which resist change for ages, so that the beautiful cut and embossed work in tanned leather from ancient Egypt may still be seen perfectly preserved in our museums. In such riding countries as Mexico, suits of leather are still worn, while in Europe the buff jerkin and the huntsman's buckskins are disappearing; but it is still everywhere acknowledged that there is nothing like leather for covering the feet. In wearing furs, our height of luxury keeps curiously close to the savage fashion of the primitive world.

Plaiting and matting are arts of such simplicity that they are known to savages. In hot countries matting is convenient for dress, as when South Sea Islanders make gowns of plaited grass, and the old art still provides the civilized world with hats and bonnets of straw or chip. Next, if we pull a scrap of woven cloth to pieces, we see that it is in fact a piece of matting done with thread. Therefore, to understand weaving, we have to begin with the making of string or thread. All mankind can twist string, but some peoples do it in a lower way than others, taking vegetable fibre, wool, or hair, and twisting it by rolling between their flat palms, or with one hand on the thigh. Our shoemakers still keep up this ancient process, which it is worth the reader's while to imitate, by twisting two strands of tow, and then rolling these into one with the reverse movement. At any rate he will find how much practice he would take to do it as cleverly as the Australians when they have the women's hair cut to furnish a supply of fishing-lines, or the New Zealanders when they run out a handful of native flax by inches into a neat and perfect cord. But the higher nations use a mechanical contrivance, the spindle, for thread-making, and the question is how this came to be invented. Fig. 69 shows what may have happened. At *a* is figured a cross-stick, forming a simple reel or winder, on which the Australians wind their hair-string just mentioned. Now if it had occurred to one of these savages to secure his thread by drawing it into a split at the end of the stick, he might have seen that by giving the hanging reel a twirl he could make it twist a new strand for him much faster than he could do between his hands. The Australian never saw how to do this. But looking at *b* in the figure, which represents an ancient Egyptian woman spinning, it is evident that such a

spindle as she is working with may have been invented by turning a mere reel to this new use. Such spindles were known over the ancient civilized world, and among the commonest objects dug up near old dwellings are the spindle-whorls of stone or terra-cotta, like great buttons, which with a stick through the middle formed the whole simple implement. Spindles may still be seen in the hands of peasant women in Italy or Switzerland. It teaches at once the permanence and the development of machinery, to watch in the factory the action of the spinning-frame which combines the ancient implement with modern appliances, a hundred spindles in a row

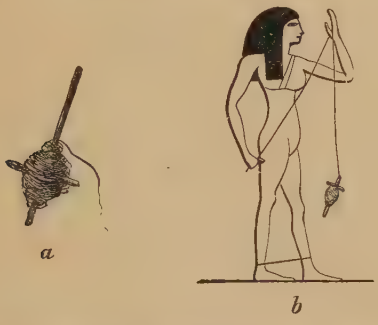

FIG. 69.—*a*, Australian winder for hand-twisted cord; *b*, Egyptian woman spinning with the spindle.

being driven rapidly by steam-power, and all tended by a single operative.

The next point is how people provided with thread or yarn taught themselves to weave it into cloth. As has just been said, cloth is a sort of matting made with threads, but as these cannot be held stiff like rushes, a number of them may be stretched in a frame to form a warp, and then the cross-thread or woof worked in and out with the fingers, or on a stick, as the Mexican girl is doing in Fig. 70. This toilsome method still suits the difficult patterns of the tapestry-weaver. But time-saving contrivances were invented very early. The ancient Egyptian pictures already show the alternate threads of the warp being lifted by cross-bars, so as to allow the woof-thread carried by a shuttle to be sent right across the piece of cloth at one throw. The looms of

classic Greece and Rome were much the same, and little improvement was made in the machine during the Middle Ages. Indeed in out-of-the-way places such as the Hebrides, the tourist may still see the old cottage-loom which, except in being horizontal so that the weaver sits to it instead of standing, hardly differs from the loom at which Penelope may be imagined weaving the famous shroud that she undid at night. Only about a century ago improvement began again, when the "flying shuttle" was invented, which instead of being thrown by hand, was driven swiftly across by a pair of levers or artificial arms. Of late years this improved loom has passed into the power-loom, the steam-engine now doing the hard labour instead of the weaver's hands and feet. The

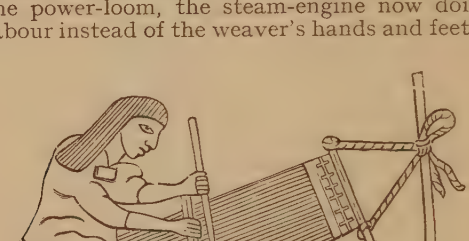

Fig. 70.—Girl weaving. (From an Aztec picture.)

ingenious device of the Jacquard loom, with its perforated cards arranging the threads, has made it possible to weave even landscapes and portraits.

The primitive *tailor* or "cutter" (*tailleur*) had not only to cut his skin or bark into shape, but to join pieces by means of sinew or thread. This art of sewing makes its appearance among savages, and is seen in its rudest form among the Fuegians who pierce their guanaco-skins with a pointed bone, push the thread through, and make a tie at each hole. Among tribes who have only such bone awls, or stiff thorns, to work with, sewing cannot get beyond the shoemaker's fashion of first making a row of holes and then pushing and pulling the thread through. But bone needles with eyes are found in the reindeer-caves of France, so that possibly the seamstresses of the mammoth-period may already have known how

to stitch and embroider their soft skins. When the metal-period began, bronze needles came into use such as are to be seen in museums, and in modern times the fine steel needles have become an example how finish and cheapness may be gained by division of labour, one set of workpeople being entirely occupied in grinding the points, another in drilling the eyes, and so on. But the sewing-needle is still in principle that of the ancient world, and hand-sewing, after holding its place for thousands of years, has suddenly had to compete with the work of the new sewing-machine, which runs its more rapid seams in a mechanically different way.

Next, as to the shape of garments. If we knew of no costume but what we commonly wear now, we might think it more a product of mere fancy than it really is. But on looking carefully at the dresses of various nations it is seen that most garments are variations of a few principal kinds, each made for a particular purpose in clothing the body. The simplest and no doubt earliest garments are wraps wound or hung on the body, and by noticing how these are worn it may be guessed how they led to the later use of garments fitted to the wearer's shape. To begin with the simplest mantles, a skin or blanket with a hole through the middle forms a ready-made garment of the poncho kind. When one throws a rug or blanket over one's shoulders, it becomes a garment which requires fastening in front, or on one shoulder, to leave the arm free. This fastening may be done with a thorn or bone pin, the primitive *brooch*, that is, "skewer" (French *broche*); we now use the word brooch to mean the more civilized metal pin with a safety-clasp, the Latin *fibula* or "fixer." Now if one stands thus draped in a blanket or sheet, one has only to raise the arms to show how naturally sleeves came to be made by sewing together under the arms. Next, putting the blanket over the head and holding it under the chin, it is seen how the part over the head will made a hood, which can be thrown back when not wanted. When it was found convenient to make the hood separate, there arose various kinds of head-covering, whose baggy shape often shows their origin, for instance the pointed "fool's-cap." When the mantle thrown over the shoulders is short, it forms the *cape* or *cope*; when long, it becomes the *cloak*, which owes its name to its likeness to a bell (French *cloche*). For convenience, many varieties of the mantle are cut into shape, as for instance

the toga in which the ancient Roman draped himself was rounded off. But ever since the invention of weaving certain garments had been worn just as they came from the loom, such as the Scotch plaid, and that ancient Eastern wrapper which we still know by its Persian name of *shawl* (*shâl*). Such woven garments are apt to keep a mark of their origin in the fringe, which in its original form is the ends of the warp-threads left on by the weaver, and when these threads are tied together in bundles they give rise to tassels. Another great group of garments are tunics, seen in a simple form in the chiton of ancient Greek female dress, which has been compared to a linen sack open at both ends, and was held up by a brooch on each shoulder, leaving openings for the arms. The tunic, closed at the shoulders and generally provided with sleeves, is the most universal of civilized garments, whether worn hanging loose like a shirt, or drawn in at the waist by a girdle or belt. In its various forms it is seen as the tunic of the Roman legionary and the "red shirt" of the Garibaldian volunteer, the coat of the mediæval noble, the smock-frock of the English peasant, the blouse of the French workman, and, lastly, it led to our modern coats and waistcoats, which are tunics made to open in front and close with buttons. One of the great steps in personal cleanliness and therefore in culture made by our forefathers, was the adoption of a linen tunic next the skin, the "short" garment, or *shirt*. Again, a piece of cloth wrapped round the body and held up by a girdle forms the skirt or kilt, and the way in which Eastern women fasten their skirts together between the feet, for convenience of walking, shows how trousers were invented. Many ancient nations wore trousers, as the Sarmatians, whose modern-looking costume may be seen on Trajan's column, and the Gauls and Britons, so that it is a mistake to call the present Highland costume the "garb of old Gaul." The classic Greeks and Romans looked on the *braccæ* or *breeches* as belonging to barbarism, but their opinion has not been accepted by the civilized world.

These remarks may lead readers to look attentively into books of costume, which indeed are full of curious illustrations of the way in which things are not invented outright by mere fancy, but come by gradual alterations of what was already there. To account for our present absurd "chimney-pot" hat, we must see how it came by successive changes from the conical Puritan hat and the

slouched Stuart hat, and these again from earlier forms. The sense of the hat-band must be found in its once having been a real cord to draw in the mere round piece of felt which was the primitive hat; and to understand why our hat is covered with silk nap, it must be remembered that this is an imitation of the earlier beaver-fur hat, which would stand rain. Even the now useless seams and buttons on modern clothes (see vol. i. p. 12) are bits of past history.

This chapter may be concluded with an account of boats and ships. He who first, laying hold of a floating bough, found it would bear him up in the water, had made a beginning in navigation. Naturally, history has kept no record of the origin of such an art. Yet the rudest forms of floats, rafts, and boats, may still be seen in use among savages, and even the civilized traveller coming to a stream or lake may be glad to make shift with a log or a bundle of bulrushes to help him across, and carry his gun and clothes over dry. Comparing these rough-and-ready means with the contrivances made with skill and care for permanent use, a fair idea may be had of the stages through which the shipwrights' art grew up.

The mere float comes lowest, as where a South Sea Island child goes into the water with an unhusked coco-nut to hold on by; or a Hottentot will swim his goats across the river, supporting his body by sprawling on one end of a drift-log of willow, which he calls his "wooden-horse." Australians have been known to come out to our ships sitting astride logs pointed at the ends, and paddling with their hands, while native fishermen of California will sit on a bundle of rushes tied up in the shape of a sailor's hammock. Rude as these are, they at any rate show that the makers have noticed the advantage which the craft with a sharp bow has over the blunt-ended log in getting through the water. In all quarters of the globe, men improve on the float by making it hollow for buoyancy; it thus becomes a boat. One way of doing this is to scoop out a log. Anyone who happens to have been up country in America may have paddled himself in such a "dug-out" across a pond or river; and, after experience of the care required to keep a cylinder from rolling over in the water, he will know how great an improvement it was in boat-building when a keel was put on to steady the craft. To savages with their stone hatchets, the hollowing out of a log is a

laborious business when the wood is of a hard kind, and they are apt to use fire to help them, setting the tree-trunk alight along the proper line and hacking away the burning wood. Columbus was struck with the size of such vessels made by the natives of the West Indies, mentioning in his letters many canoes of solid wood, "multas scaphas solidi ligni," some so large as to hold seventy to eighty rowers. The Spaniards adopted their Haitian name *canoa*, whence our *canoe*. Yet this *dug-out*, or *monoxyle* ("one-log"), to use its Greek name, was well known in other barbaric countries, and had been common in Europe in ages before history, as may be seen by the specimens in museums, preserved by the peat or sand in which they were found imbedded. Even the Latin word *scapha*, used above, carries the record of this early boat-building; it is Greek *skaphē*, which corresponds so exactly in meaning to the term "dug-out," as to be an evident relic of the time when boats were really scooped out of solid trunks; related to these words are English *skiff* and *ship*, so that the line of connexion in names runs through from first to last. Another very simple way of making a boat is that seen among the Australians, where a man will strip a sheet of bark off the stringy-bark tree, tie it together at the ends, and paddle off in this improvised bark-canoe. If, however, it is to be used more than once, he sews the ends together, and puts in stretchers or cross-pieces of wood to keep it in shape. Thus appears the bark-canoe, not unknown in Asia and Africa, and attaining in North America its greatest perfection, with its framework of cedar and sheathing of sheets of birch-bark sewed together with fibrous cedar-roots. Such canoes are still in full use in districts like the Hudson's Bay territory, being well suited to a broken navigation where rapids make it needful to carry boat and cargo overland, or a "portage" has to be made from one river to another. The principle of skin-canoes is much the same, using hide for bark. North American Indians crossing rivers have been known to turn the skins of their tents into vessels by means of a few twigs to keep them stretched. Scarcely above this are the round skin-covered boats of boughs of Mesopotamia, and the portable coracles of the ancient Britons; on the Severn and the Shannon fishermen still go down to the river carrying on their backs their coracles, now made of tarred canvas on a frame, but modelled on the ancient type. The Esquimaux kayak has its frame-

work of bone or drift-wood on which are stretched the seal-skins which convert it into a water-tight life-buoy, in which the skin-clad paddler can even turn over sideways and bring his boat up right on the other side. Our modern so-called canoes are imitations of this in wood.

Next, when the barbaric shipwright comes to improving a dug-out canoe by sewing or lacing on a strip of thin board as a gunwale, or making his whole boat by sewing thin boards together over the ribs, instead of skins or sheets of bark, he brings his vessel a stage nearer to our boats. From Africa across to the Malay Archipelago, such sewn ships used to be, and often still are, the ordinary native craft. The South Sea Island canoes, thus laced together with sinnet or coco-nut fibre braid so neatly that the joints hardly show, are marvels of barbaric carpentry. In the gulf of Oman, men used to go across to the coco-nut islands with their tools, cut down a few palms, make the wood into planks, sew these together with cord made from the bark, make sails of the leaves, load the new-made ships with the nuts, and set sail.

Before coming to the ships of civilized nations, let us look back for a moment to the ruder floats. Two or three logs fastened together form a raft, which though clumsy to move has the advantage of not upsetting, and carrying a heavy load. At the time of the discovery of Peru, the Spaniards were amazed to meet with a native raft out in the ocean, and with a sail set. The rafts which bring goods down the Euphrates and Tigris are buoyed with blown sheep-skins; at the end of the voyage the raft is broken up and the wood sold, so that only the empty skins have to go back to serve another time. With still more perfect economy, the rafts down the Nile are buoyed with earthen pots for sale in the bazaar, so that nothing goes back. Timber-rafts, like those on the Rhine, are well arranged for merely floating down stream. But when a raft has to be driven through the water by oars or sails, its resistance is excessive, and it has occurred to the Fijians and other islanders that a raft formed by two parallel logs united by cross-poles and carrying a raised platform, would go more easily. Looking at this simple contrivance, it has been reasonably thought that it led up to the invention of the outrigger canoe, known in ancient Europe, and now prevailing in the Pacific and as far as Ceylon. One of

the two logs is now represented by the canoe, the second remaining as the outrigger log, fastened to the ends of the two projecting poles, so as to steady the whole in rough weather. Or indeed the two logs may both become canoes, and the platform be retained; thus we have the Polynesian double-canoe, whose principle has been lately turned to account in the double-steamboat to smooth the passage between Dover and Calais.

Next, as to the ways by which boats are propelled through the water. The origin of rowing is plainly shown by the Australian straddling his pointed log and paddling with his hands, or by the fisherman of the Upper Nile propelling with his feet the bundle of stalks he sits astride on. The primitive wooden paddle, imitating the form and doing the work of the flat hand or foot, is well known to savages, who mostly use the single paddle with a blade or shovel end; the double-ended paddle, such as our canoeists have borrowed from the Esquimaux, is a peculiar improved form. The paddle used free-handed to dig or sweep at the water is best suited to the narrow bark-canoe or hollowed trunk, but for larger craft it is a rude contrivance as compared with the civilized oar, which is a lever pulled against a fulcrum so as to use more of the rower's force, and in a steadier pull. The difference between barbaric and civilized knowledge of mechanical principles is well seen by comparing a large South Sea Island canoe, with twenty paddlers shovelling the water, to one of our eight-oared launches. Of sails, perhaps the simplest idea is to be seen in Catlin's sketch of North American Indians standing up each in his canoe, holding up his blanket with outstretched arms with its lower end tied to his leg, and so going before the wind. The rudest regular sail used anywhere is a mat or cloth held up by two sticks as stays at the upper corners and made fast below, or supported by an upright pole and cross-piece, the primitive mast and yard. It is so common for the lower tribes of men never to sail their boats, that it is difficult to imagine that their ancestors ever knew how. Surely they would have kept it up, for the art of saving so much labour with so little pains would not easily have fallen out of mind. It seems more likely that the invention of the sailing vessel belongs to a period when civilization was far advanced. Yet this period was very ancient.

Up to this point, in making out how the simpler kinds of boats came into existence, history gives no help. Not

only does their origin mostly lie beyond record, but by the time we come fairly into history we find the ancient nations knowing how to build vessels of more advanced order, framed with keel and ribs, and sheathed with nailed planks, in fact the direct predecessors of our own ships. Egypt, or somewhere else in that Old World region of ancient culture, may have been the original centre whence the higher shipwrights' craft spread over the world. It is instructive to study the ancient Egyptian vessel (Fig. 71) depicted on the wall of a Theban tomb, and to see how far it already has in a rudimentary state the parts which we recognise as belonging to the fully-developed ship. As was common,

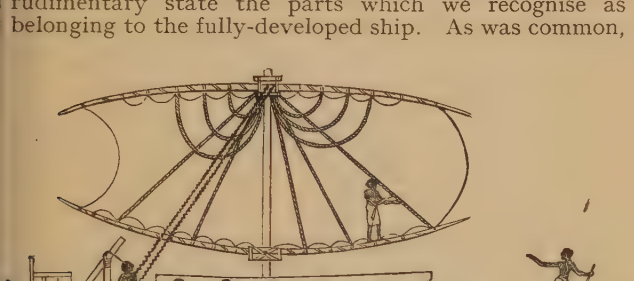

FIG. 71.—Ancient Nile-boat, from wall-painting, Thebes.

it was a combination of rowing-galley and sailing-ship. The rowers sit on cross benches, pulling at the oars which pass through loops, while at the stern is worked the great steering-oar which is the ancestor of our *rudder* (this used to be merely an oar, which its name originally meant, like *ruder* in German). There is a mast held up by stays and carrying yards, with ropes rigged to hoist them and to furl the sail. The forecastle and poop are already represented by raised structures on the deck. In the Egyptian pictures of war-ships it is seen how these served as stations for the archers, while the fighting-men were also protected behind a bulwark, and there is even the "crow's nest" on the top of the mast serving as a place for slingers to hurl stones from at the enemy, from which comes our "mast-head." Comparing with the

Egyptian vessels the ancient galleys and ships of the Mediterranean, whether Phœnician, Greek, or Roman, it is impossible to think these can have come into existence by separate lines of invention; the family likeness among them is too strong. Even farther off, the likeness of the craft still used in the Ganges to the ancient Nile-boats is surprising, and the eye of Osiris painted on the Egyptian funeral bark that carried the dead across the lake to the western burial-place may perhaps have first suggested the painting of eyes as ornaments on the bows of boats, from the barks in Valetta harbour in the west to the junks of Canton in the east. In following the course of development from the ancient to the modern ship, we notice that from time to time new appliances come in, as metal sheathing to protect the planks from the boring teredo, the iron fluked anchor instead of a great stone, the capstan for hauling, &c. More masts and spars now served to carry more sails, and tier above tier of rowers impelled the classic bireme and trireme. The war-galley lasted on into our own time in the Venetian navy, kept in use in spite of its bad sea-going quality, for its power of dashing upon sailing-vessels helpless in a calm. The galley-slaves who laboured at the huge oars were captives or criminals, and, though the French galleys no longer remain for penal servitude, the term *galérien* or galley-slave still means a convict. The vast improvement of European sailing-vessels in the Middle Ages is in great measure due to an invention learnt from the far east—the mariner's compass. Ships, now able to steer their courses on long voyages out of sight of land, were improved in build and rigging, while the men-of-war with several decks armed with tiers of cannon became floating castles. Lastly, during the present century, steam-power has been applied to propel the ship from within, the paddle-wheel or screw in fact taking the place of the old banks of oars, and the changeable wind-power being now only turned to account as an occasional aid and means of saving fuel. It is needless to describe the changes which modern armour-plating and huge guns have made in the construction of ships of war, but even these still show plainly enough how they were formed by successive alterations from the primitive canoe.

CHAPTER XI

ARTS OF LIFE—(*concluded*)

Fire, 25—Cookery, 28—Bread, &c., 30—Liquors, 31—Fuel, 32—Lighting, 34—Vessels, 35—Pottery, 35—Glass, 37—Metals, 38—Bronze and Iron Ages, 39—Barter, 41—Money, 42—Commerce, 44.

THE subject next to be considered is Fire and its uses. Man understands fire and deals with it in ways quite beyond the intelligence of the lower animals. There is an old story how, in the forests of equatorial Africa, when travellers had gone away in the morning and left their fires burning, the huge manlike apes called pongos (probably our gorillas) would come and sit round the burning logs till they went out, not having the sagacity to lay more wood on. This story is often repeated to contrast human intelligence with the dulness of even the highest apes. Of course there had been forest-fires in ages before man, as when the trees had been set in flames by lightning or by a lava stream. But of all creatures man alone has known how to manage fire, to carry it from place to place with burning brands, and when it went out to produce it afresh. No savage tribe seems really to have been found so low as to be without fire. In the limestone caverns, among the relics of the mammoth period, morsels of charcoal and burnt bones are found imbedded, which show that even in that remote antiquity the rude cave-men made fires to cook their food and warm themselves by.

As to the art of producing fire, the savage way was mostly by the friction of two pieces of wood, and to this day travellers may now and then see the simple apparatus at work. The hand fire-drill consists of a stick like an arrow-shaft cut to a blunt point, which is twirled like a chocolate-muller between the hands (shifted up when they get too far down) with such speed and pressure as to bore a hole into an under-piece of wood, till the charred dust made by the boring takes fire. Fig. 72 shows a Bushman thus drilling fire while his companion

attends to the tinder. The Polynesian way is different, pushing the pointed stick along a groove of its own making in the under-piece- of wood. Either method will make fire in a few minutes, but knack and proper choice of wood are needed, and one of us will hardly succeed. For easier working, some nations have long had a mechanical improvement on the simple savage fire-drill, by driving it with a thong wound a couple of turns round the stick, and pulled to and fro; also, working it with a bow like the common bow-drill of our tool-shops is not unknown. In either case a top-piece is required to keep the drill down (not too hard) on its bearing.

Among civilized nations, the old fire-drill had already

FIG. 72.—Bushman drilling fire (after Chapman).

in ancient times been superseded in common use by better contrivances, especially the flint and steel. But although discarded from practical life, it has been kept up for ceremonial purposes. As has been already mentioned (vol. i, p. 12), the Hindu fire-priest may be still seen "churning" with a fire-drill driven by a cord the divine fire for their sacrifices, thus religiously keeping to the old-fashioned instrument used in daily life by the early Aryans. The ancient Romans had such a survival of their past state of arts in the law that, if the vestal virgins let out the sacred fire, it was to be made afresh by drilling into a wooden board. The old art has even lasted on in Europe to our own day as the orthodox means of kindling the "need-fire," with which, when there was a murrain, the peasants in many parts used to light bonfires to drive the horses and cattle through, to save them from the pestilence. This rite, inherited from

the religion of præ-Christian times, requires new wild-fire made by friction, not the tame fire of the hearth. The last need-fire on record in Great Britain is perhaps one that was made in Perth in 1826, but they may still be seen in Sweden and elsewhere when there is cholera or other pestilence about. In the last century there was a law passed forbidding the superstitious friction-fire in Jönköping, the very district now famous for its cheap *tandstickor* or tinder-sticks, that is, lucifer-matches. So curiously do the extremes of civilization come together in the world.

The fire-drill is a means of converting mechanical force into heat till the burning-point of wood is reached. But all that is really wanted is a glowing hot particle or spark, and this can be far more easily got in other ways. Breaking a nodule of iron pyrites picked up on the sea-shore, and with a bit of flint striking sparks from it on tinder, is a way of fire-making quite superior to the use of the wooden drill. It was known to some modern savages, even the miserable natives of Tierra del Fuego; to the præhistoric men of Europe, as appears from the bits of pyrites found in their caves; and of course to the old civilized world, as witness the Greek name of the mineral, *puritēs* or "fiery." Substitute for this a piece of iron, and we have the flint-and-steel, the ordinary apparatus of nations from their entry into the iron age till modern times. Yet even this has now been so discarded that the old-fashioned kitchen tinder-box with its flint and U-shaped steel, and damper for preparing the tinder from scraps of burnt linen to light the brimstone-match with, has become a curiosity worth securing when found by chance in some farmhouse. Mention need hardly be made here of the burning-lens and the concave mirror known in ancient Greece, nor of the wooden condensing syringe (much like that described in our books on physics) known in the Chinese region; these are rather curious than practically important. Quite otherwise with the invention of the lucifer-match, dating from about 1840. Its action depends on phosphorus igniting by being rubbed, the head of an ordinary lucifer being of an inflammable composition, containing chlorate or nitrate of potash, which is fired by particles of phosphorus mixed in with it; for the safety-match, these particles of phosphorus are put, not in the match-head, but on the rubber instead.

In the low levels of civilization the hut is often so small

that the fire has to be made outside. But when it becomes spacious enough, the fire of logs burns on the hard-trodden earth in the middle of the hut, the smoke finding its way out as it can by door and cracks. Those who have chanced to spend a night lying on the ground with their feet to the fire in such a dwelling know both what place the fire has in barbaric comfort, and how that comfort was increased when builders took the trouble to make a smoke-hole in the roof, and afterwards came to a real chimney. The history of artificial warming from this point lies so plainly before us as not to need a long description. From the fire of a few sticks on the cottage hearth, we come to the wide fire-places in the halls of country houses, with their fire-dogs, after the fashion of the Middle Ages. Then come the coal-fires in open grates, the closed stoves, and the arrangements for warming the house with currents of hot air, or circulating pipes of hot water.

From house-warming we come to cookery. The heat applied in cooking food, bursting the cells and softening the tissues so as to make it easier to chew, is an important aid to digestion, saving energy which would be wasted on assimilating raw flesh or vegetables. It would not indeed be impossible for man to live on uncooked food, and perhaps the nearest approach to this is found on some coral islands of the Pacific, where raw fish and coco-nuts form a great part of the native diet. Low tribes, especially half-starved wanderers of the deserts, such as the Australians, eat insects, grubs, shellfish, and small reptiles, raw as they find them; and Brazilian forest-men have been seen to imitate the ant-bear by poking a stick into an ant-hill, and letting the ants run up it into their mouths. These practices shock Europeans, who themselves however have no scruples as to oysters and cheese-mites, to which they happen to be accustomed. But these rude tribes know how to cook, as indeed all mankind do, the familiar definition of man as the "cooking animal" having no proved exception, ancient or modern. Civilized nations have come so thoroughly to this way of assisting nature, that they cook almost everything they eat, only keeping up primitive habits in eating nuts, berries, and other fruit raw as more pleasing to the taste. It has long been looked on as a sign of low culture to eat raw meat, like the Eurytanes of the interior of Greece whom Thukydides mentions as "most ignorant in their speech, and said to be raw-

eaters (*ōmophagoi*)." Even the native tribes of New England were struck with this habit among the roving race of the far north, whom they called accordingly *Eskimantsic* or "raw-flesh-eaters," a name they still bear in its French form *Esquimaux*.

The roughest ways of cooking are to be seen among savages, who broil their meat on the burning logs, or roast it stuck on the primitive spit, a pointed stake planted sloping over the fire, or bury it in the hot embers as boys do chestnuts or potatoes. From this latter mode comes the invention of the oven, which in its simplest form may be a pit dug in the ground, often lined with baking-stones; when it has been heated by a wood-fire within, the meat or vegetables are put in and covered up with ashes. Brazilian tribes set up four posts with a grating of branches across, on which they laid their game and fish with a slow fire underneath. Meat prepared on such a *boucan* will keep a long while; the pirates of the West Indies used thus to prepare their stores of meat, whence comes the word *bucaneer*. To the buffalo-hunting tribes of North America belongs the invention of *pemmican*, meat dried and pounded for keeping, while in many parts of the world people know how to dry sheets or strips of meat in the hot sun; this is called *jerked* meat, and will keep. The use of hot stones in baking has just been mentioned. From this the important art of boiling food may have been derived. In many parts of the world, among tribes who do not know how to make an earthen pot, there is found the curious art of stone-boiling, which is a sort of wet baking. The Assinaboins of North America have their name, which means "stone-boilers," from their old practice of digging a hole in the ground, lining it with a piece of the slaughtered animal's hide, and then putting in the meat with water, and hot stones to boil it. Tribes of the far West actually managed by means of red-hot stones to boil salmon and acorn-porridge in their baskets made of close-plaited roots of the spruce fir. The process of stone-boiling has lasted on even in Europe where found convenient for heating water in wooden tubs. Linnæus on his northern tour found the Bothland people brewing beer in this way, and to this day the "rude Carinthian boor" drinks such "stone-beer," as it is called. As soon as the cooks anywhere are provided with earthen pots or metal kettles, boiling over the fire becomes easy. Yet it is curious to notice the absence of boiled meats

from the feasts of the Homeric heroes, where there is so much about the joints stuck on spits to roast, and the vengeful Odysseus rolling to and fro on his bed is compared to an eager roaster turning a stuffed paunch before the blazing fire. Among the old Northmen it was otherwise, for it is told in the Edda how the warriors feast every night in Walhalla on the sodden flesh of the boar Sæhrimnir, who is daily boiled in the huge kettle, and comes to life again ready for the morrow's hunt.

The simplest ways of making bread, such as seem to have come in with the earliest cultivation of grain, answer so well for some purposes that they may still be seen almost unchanged. Thus in a north-country cottage the housewife moistens the oatmeal and kneads it into dough, which spread out thin is baked into oat-cakes on the hot iron girdle (it used to be a hot stone); and the damper of the Australian colonist is as simply made with flour and water in thick cakes, baked in the embers. These take us back near the primitive stages of an art which almost more than any other has civilized mankind. Such unleavened bread being first in use, the invention of leavened bread would follow as a matter of course, by the sour dough on the uncleaned vessel fermenting into *leaven* (French *levain*, lightening), which starts fermentation through the fresh dough, disengaging bubbles of carbonic acid within it which expand it into a spongy mass. In later times the yeast from brewing was found to be a better means than leaven; and there are modern processes of introducing the gas by means of baking-powder (such as sal-aëratus or aërated salt, bicarbonate of soda), or the bread may be aërated by mixing the carbonic acid gas mechanically. The other great means of preparing farinaceous or starchy food is by boiling, which lets the starch out to mix with the water by bursting the tiny granules in which it is enclosed. Rice boiled whole furnishes about half the food of mankind, and among other staple articles of vegetable food are the various kinds of pap or porridge made with wheat, barley, oats, maize, sago, cassava, &c. Looking over a modern cookery-book, it is seen what an endless list of dishes and sauces have been contrived by clever cooks, to please the palate and make one wish for more. As to progress in cookery in this way, no doubt the moderns have left the ancients behind. But, after all, the main purpose of cooking food is to bring it into a proper condition for keeping up and working the human machine,

body and mind. Examining it from this point of view, it is curious to notice what an old-world business it is. Its main processes of roasting, baking, and boiling, belong to the barbaric stage of culture, and had their origin in ages before history.

The liquors drunk by man may next be noticed. Savage tribes such as the Australians were water-drinkers when discovered by the Europeans, and even the Hottentots and North American Indians knew no fermented drinks. It is difficult to suppose that an indulgence so tempting would ever be forgotten, if once known; so that possibly the ancestors of these peoples may have from the first been ignorant of the art of fermenting liquor. But in most countries, especially where grain and fruit were cultivated, one would think that the process must sooner or later discover itself, by the accident of some suitable juice or mash being left to stand. In Mexico the milky juice of the aloe is fermented into pulque; in Asia and Africa palms are tapped for palm-wine or toddy; cider from apple-juice, and mead from honey and water, are well known; the Tatars ferment their mares' milk into kumiss. Especially liquors of the beer kind prevail widely; the first mentioned in history is the beer brewed from barley by the ancient Egyptians, whence may perhaps be traced the ancient ale or beer of Europe; allied to it are the kvass or rye-beer of Russia, the pombe or millet-beer of Africa, the so-called rice-wine of the Chinese, the chicha made with maize or cassava by the natives of America. Wine seems not less ancient, and the Egyptian paintings show the vineyards, the wine-presses, the wine-jars; indeed, wine-making is still much what it was in those early ages of history. In ancient times it is curious to notice the frank undoubting delight of men in intoxicating drink, as a divinely given means of drowning care and stimulating dulness into wild joy. They drank it solemnly in their religious feasts and offered it to their gods. The ancient bards of the Vedic hymns thought no ill in singing of Indra the Heaven-god, reeling drunk with the libations of the sacred soma poured out by his worshippers, and in later ages the Greeks chanted in bacchanal processions the praises of the beneficent Dionysos, who made all nations happy with the care-dispelling juice of the grape. But in early times also there comes into view an opposite doctrine. The guardians of religion, sensible of the evil of drunkenness,

begin to proclaim not only excess as hateful, but the very tasting of strong drink a sin. The Brahmans, although the libation of the soma remains by old tradition among their sacred rites, yet account the drinking of spirituous liquors one of the five great sins; while in the old rival religion of Buddha, one of the ten precepts or commandments which the novice promises to obey is that forbidding the use of intoxicating liquor. Though the religion of Mohammed arose in great measure out of Judaism and Christianity, he cast off their ancient honour for wine and its use in sacred rites, forbidding it as an abomination. It was not till the Middle Ages that distilled spirit, though more ancient in the East, came into use among the western nations. It was generally accepted as beneficial, as is well seen in the name of "water of life," Latin *aquavitæ*, French *eau-de-vie*, Irish *usquebaugh* (for shortness *whisky*). Alcoholic spirit is now produced in immense quantities from the refuse of wine-making, brewing, sugar-refining, &c. Its employment as an habitual stimulant is among the greatest evils of the modern world, bringing about in the low levels of the population a state of degradation hardly matched in the worst ages of history. On the other hand, modern civilized life has gained in comfort by taking to the use of warm slightly stimulant drinks. Tea, at first valued by the Buddhist monks in Central Asia as a drug to keep the ascetic awake for his nightly religious duties, seems to have been introduced as a beverage in China at about the Christian era, and has spread from thence all over the world. Coffee is at home in Arabia, and the world owes its general use to the Moslems. Chocolate was brought by the Spaniards from old Mexico, where it was a favourite drink. With these, mention has to be made of tobacco, also an importation from America, where at the time of the discovery it was smoked by natives of both the north and south continent.

In here describing fires and fire-places (p. 28), wood has been taken as the primitive fuel. Indeed, the fire of fallen boughs made at a picnic in the woods may take our minds fairly back to prehistoric life. When in the savage hut the logs are piled on the earthen floor, this simple hearth already becomes the gathering-place of the family and the type of home. But in treeless districts the want of fuel is one of the difficulties of life, as where on the desert plains the buffalo-hunter has to pick up for the evening fire the droppings which he calls "buffalo-

chips " or " bois de vache." Even in woodland countries, as soon as people collect in villages, the fire-wood near by is apt to run short. When some American Indians were asked what reason they supposed had brought the white men to their country, they answered quite simply that no doubt we had burnt up all our wood at home, and had to move. The guess was so far good that something of the kind must really have happened had we depended on the fuel from our forests and peat-bogs, for the supply in England was giving out. Thus what was in old times the forest-land of Kent and Sussex, and has still kept its name of the Weald (*i.e.* wood), is not now well-timbered, but this is because in Queen Elizabeth's time it had been stripped to make charcoal for the iron furnaces. Indeed, there then seemed danger that as population increased and manufactures throve, England might become like North China now, where in the cold weather people huddle at home wrapped in furs, fuel being too scarce except for the cooking-stove. But instead of this coming to pass, there took place an industrial change in England, which multiplied the population and brought on our present prosperity. This was the use of coal, on which our modern manufacturing system depends. Even for household purposes the coal-cellar has almost superseded the wood-stack, and the blazing yule-log has become a picturesque relic of the past. The very word *coal*, which in the English Bible keeps its original sense of burning wood, has since been usurped by the mineral. It must not, however, be supposed that the use of coal was only discovered in modern times. The Chinese have mined it from time immemorial. In the thirteenth century, the famous Venetian traveller, Marco Polo, related that in Cathay there is a kind of black stones, which are dug out of veins in the mountains, and burn like faggots; and I can tell you (he says) that, if you put them on the fire in the evening so that they catch well, they will burn all night and even be alight in the morning. That this was told and received as a wonder in Europe, shows how unfamiliar the use of coal then was. Though *lithanthrax* or " stone-coal " was not unknown to the ancients, its full importance to modern life only came gradually into view. Having first been brought in for economy to meet the scarcity of wood, it afterwards became, when applied to the steam-engine, an almost boundless source of power for all mechanical work. A steam-engine, for

every few shovelfuls of coal its furnace is fed with, will do the day's work of a horse. Thus the yearly output of millions of tons of steam-coal in Great Britain alone furnishes a supply of force in comparison with which what was formerly available from windmills and water-mills and the labour of men and beasts was quite small, while the workman's task becomes more and more that of directing this brute force to grind and hammer, to spin and weave, to carry across land and sea. It is like the difference between driving the waggon and carrying the sacks of corn to market on one's own back. It is an interesting problem in political economy to reckon the means of subsistence in our country during the agricultural and pastoral period, and to compare them with the resources we now gain from coal, in doing home-work and manufacturing goods to exchange for foreign produce. Perhaps the best means of realizing what coal is to us will be to consider that, of three Englishmen now, one at least may be reckoned to live by coal, inasmuch as without it the population would have been so much less.

The Australian savage would catch up a blazing brand from the camp-fire, to light him into the dark forest and scare away the demons. Thus there is as yet no difference between his primitive means of artificial heat and light. The two begin to separate when resinous pine-splints or the like are set aside to serve as natural flambeaux, and from this the next step is to make artificial flambeaux, of which the commonest is the twist or *torch* (from Latin *torquere*) of oakum dipped in pitch or wax. Till this century we used torches much as the ancient Romans did, but they are now seldom to be seen, and by their disuse the picturesque side of life loses many striking effects of torchlight glare and shadow on banquet and procession—the delight of painters and poets. Not half the passers-by in old-fashioned streets now know that the extinguishers on the iron railings were to put out the links or torches carried to light the company to their coaches. The candle looks as though it might have been invented from the torch. The rushlight, made of the pith of the rush dipped in melted fat, was in common use in Pliny's time, as was also the wax or tallow candle with its yarn wick. The old classic lamp was a flattish oval vessel with a nozzle (*i.e.*, nostril) at one end for the wick to come out at. Simple as this construction is, it has had a long unchanged use. Museums have few

Greek and Roman objects more plentiful than such earthenware lamps, nor more exquisite specimens of metal-work than the bronze ones; and to this day the traveller off the main road in Spain or Italy is lighted to his bedroom with a brass stand-lamp much after the manner of the ancients, with its pick-wick hanging to it by a chain. The lamp only came into its improved modern make about a century ago, when Argand let the air in from below, and put on the glass chimney to set up a draught. The gas-lamp is still later, only having come into practical use during the last sixty years. But it is curious to notice that natural gas-lighting had long been known in places where decomposing bituminous beds underground set free carburetted hydrogen. Thus at the famous fire-temples of Baku (west of the Caspian), a hollow cane was stuck in the ground near the altar, through which the gas rose and burnt at its mouth, while the pilgrim fire-worshippers prostrated themselves and adored the sacred flame. In China, at salt springs where such a supply of natural gas comes up, the practical-minded people have for ages laid it on through bamboos to boil the brine-kettles and light up the works. Of late in Pennsylvania, the example has been followed on an immense scale.

The examination here made of the modes of cooking requires some notice of vessels. For water-vessels men can make shift without the art of the potter, using joints of bamboo, coco-nut shells, calabash rinds, buckets scooped out of wood, pails of bark, bottles of skin. The horseman in desert regions carries his water-gourd at his saddle-bow, and even where a glass imitation has come in the French go on calling it a *gourde*, just as we keep up the name of the old leather *bottle* for the glass ones we use now. It was one of the greatest household inventions to make earthen pots to stand the fire for boiling. When and where pottery was invented is too far back to say. On the sites of ancient dwellings, wherever earthenware was in use, potsherds may be picked up in the ground. Where they are not to be found, as among the relics of tribes of the reindeer-period in the caves of France, it may be safely concluded that these early savages had not come so far in civilization. The same is true of the Australians, Fuegians, and many other modern savages who had no pottery, and no broken bits in their soil to show that their predecessors ever had. One asks, how did men first hit upon the idea of making an earthen pot?

It may not look a great stretch of invention, but invention moved by slow steps in early culture, and there are some facts which lead to the guess that even pots were not made all at once. There are accounts of rude tribes plastering their wooden vessels with clay to stand the fire, while others, more advanced, moulded clay over gourds, or inside baskets, which being then burnt away left an earthen vase, and the marks of the plaiting remained as an ornamental pattern. It may well have been through such intermediate stages that the earliest potters came to see that they could shape the clay alone and burn it hard. This shaping was doubtless at first done by hand, as in America or Africa the native women may still be seen building up large and shapely jars or kettles from the bottom, moulding on the clay bit by bit. So in Europe, as any museum of antiquities shows,

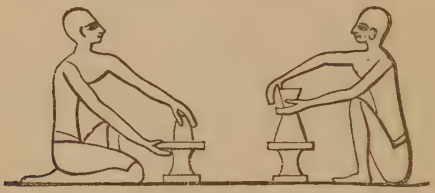

Fig. 73.—Ancient Egyptian Potter's Wheel (Beni Hassan).

the funeral urns and other earthen vessels of the stone and bronze ages were hand-made; and even now tourists who visit the Hebrides buy earthen cups and bowls of an old woman who makes them in ancestral fashion without a potter's wheel, and ornaments them with lines drawn with a pointed stick. Yet the potter's wheel was known in the world from high antiquity. Fig. 73 represents Egyptian potters at work, as shown in the wall-paintings of the Tombs of the Kings. It is seen that they turned the wheel by hand. So the Hindu potter is described as now going down to the river side when a flood has brought him a deposit of fine clay, when all he has to do is to knead a batch of it, stick up his pivot in the ground, balance the heavy wooden table on the top, give it a spin round, and set to work. It was an improvement on this simplest wheel to work it from below by the foot, and in our potteries a labourer drives it with a wheel and band, but the principle

remains unchanged. As we watch with untiring pleasure the potter with this simple machine so easily bringing shape out of shapelessness, we can well understand how in the ancient world it seemed the very type of creation, so that the Egyptians pictured one of their deities as a potter moulding Man on the wheel. Fine art made some of its earliest and most successful efforts in shaping the earthen vase, engraving and moulding patterns or figures on it, and painting it with pictures of gods and heroes, or scenes from myth or daily life, so that much of our knowledge of such nations as Etruscans and even Greeks is derived from the paintings on their vases, art-relics almost everlasting though so fragile. A great part of the pottery of the world is still of the first and simplest kind, mere baked clay (Italian *terra cotta*) without glaze, like our flower-pots, and therefore porous. To cure this fault, some people, as the Peruvians, varnished it, while even the Greeks often burnt in bitumen. The great improvement of glazing, that is, melting on a glassy coating in the furnace, was already known in ancient Egypt and Babylonia, while in later ages glazed earthenware reached high artistic excellence in the Persian ware and the *majolica* (from Majorca). In China a more perfect ware had been made above a thousand years before European potters got at the secret of imitating it. We call it *china*, or by the curious name *porcelain*, which originally meant a kind of oriental nacre or mother-of-pearl. China or porcelain dishes are ordinarily manufactured from a mixture of fine white kaolin or porcelain clay and felspar, which has to be fired at a sufficiently high temperature to render it semi-vitreous throughout, and translucent. The common principle in the make of these two kinds of pottery, glazed earthenware and Chinese or European china, lies in the presence of the fusible glassy silicates, which form a coating on the surface or are diffused through the substance.

Glass is a mixture of silicates of two or more of the bases: soda, potash, lime, lead oxide. There is a fanciful story told by Pliny, describing its invention as having taken place on a sandy shore of Phœnicia, where a ship happening to be moored, the merchants, finding no stones to boil their kettle on, brought on shore lumps of nitre with which the ship happened to be laden, whereupon the fire melted the silica and alkali into glass. But the fact is that glass-making was an Egyptian art ages

before the rise of Phœnician commerce, and to all appearance the Phœnicians and other nations learnt it from thence. Fig. 74 shows an Egyptian glass-blower. Among other things he would have made flasks to be covered with reed, much like our present oil-flasks. The ancient Egyptians made glass beads, and variegated glass cups, which even the Venetian glassworks can hardly match. But modern Europe may claim the clever art of making crown glass for window-panes by twirling the red-hot blown globe till it opens in a circular sheet, and also the polishing of sheets of plate-glass, which make possible our great looking-glasses with their backs of brilliant tin amalgam.

Fire is so important a means in extracting metal from the ore and working it afterwards, that some account of the use of metal may properly come in this chapter. But

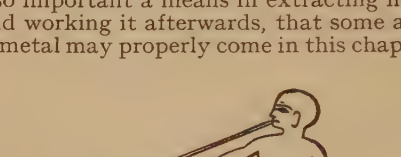

Fig. 74.—Ancient Egyptian Glass-blowing (Beni Hassan).

in thinking how men were led to the difficult processes of smelting ores to extract the metal, it has to be remembered that some metals are found in the metallic state. Thus the native copper near Lake Superior was used in long-past ages by the tribes then living in the country, who treated bits of the metal as a kind of malleable stone, hammering it cold into hatchets, knives, and bracelets. The same is true of gold, natural nuggets of which can be beaten cold into ornaments. It is only a guess that metal-working may have begun in this simple way; still it seems a likely guess. Iron also is found in the metallic state, especially in the aerolites or meteoric stones which fall on the earth from time to time. Though in many of these the metal is apt to shiver to bits under the hammer, there is some meteoric and other native iron fit to be made into implements when heated white-hot in the forge, and it can even be to some extent worked cold. Some of the ores of metal are themselves so metallic-

looking that the smith would attempt to work them in the fire, and this may have led to proper smelting. Thus magnetic iron ore not only looks like iron, but can be heated in the forge, and then and there hammered into such things as horse-shoes.

It is a question whether men first worked copper or iron. In classic times, indeed, people felt certain that bronze was in use before iron. This bronze is an alloy of copper with about a ninth of tin to harden it, what an English mechanic would now call "gun-metal." An often-quoted line of Hesiod's tells how the men of old worked in bronze when as yet black iron was not; and Lucretius, the Epicurean poet, taught that after the primitive time when men fought with sticks and stones, iron and bronze were discovered, but bronze was known before iron. However, the Greeks and Romans did not really remember very ancient times, and in some countries the use of iron was early. Egyptian and Babylonian inscriptions make mention of iron as well as copper. A piece of wrought iron taken out of the masonry of the great pyramid may be seen in the British Museum, and there are Egyptian pictures even showing the blue steel which the butcher had hanging at his side to sharpen his knife on. Now what is to be particularly noticed is that the Egyptians, though they thus had iron, mostly made their carpenters' tools of bronze. Among the Homeric Greeks, the smiths knew of iron, and even of steel or steely iron, if one may judge so from the famous passage in the Odyssey (ix. 391), about the hissing of the axe as the smith dips it in the cold water to strengthen the iron. Yet all the while bronze was the ordinary material not only for the warrior's armour and shield, but for his spear and sword. Clearly we have here a state of arts very unlike our own now, and it is worth while to try to understand the difference. An instructive remark in Kaempfer's account of Japan near two centuries ago, may help to explain it, where he says that both copper and iron were smelted in the country, and were about the same price, so that iron tools cost as much as copper or brass ones. The state of things far back in the ancient world may have been something like this. Iron, though known, was hard to smelt from the ore, and Homer's calling it the "much-wrought iron" shows how difficult the smiths found it to forge. But copper was plentiful, one well-known source being the island of Cyprus, whence its name of *æs Cyprium* (*copper*). Tin

had not to be fetched from the ends of the world; there were mines in Georgia, Khorassan, and elsewhere in inner Asia, where perhaps the discovery was made of using it to harden copper into bronze. When once this had been hit upon, the ease with which bronze could be melted, and such things as hatchets cast in stone moulds, would make it more convenient than iron to the ancient artificer. This may have been the real reason why the "bronze age" set in over a great part of Europe and Asia, and was only followed by the "iron age" when iron, coming to be better worked, cheaper and more plentiful, and steel especially being improved, brought out that superiority to bronze for tools and weapons which to us seems a matter of course. The remains of the lake-dwellings of Switzerland show how central Europe was once inhabited by rude tribes using stone implements, how at a later period bronze hatchets and spears prevailed, and lastly iron came in. Such, too, has been the history of the stone, bronze, and iron ages, traced by archæologists in the burial-places of old Scandinavia, whether the use of the new metals was learnt by the native nations or brought in by conquering invaders. Nations living in the bronze age are known to history, especially the Mexicans and Peruvians, whom the Spaniards at the conquest found working in bronze with some skill, but knowing nothing of iron; their state was like that of the Massagetæ of central Asia, described by Herodotus some two thousand years earlier. Most of Africa, on the other hand, seems to have had no bronze age, but to have passed directly from the stone age to the iron age. Iron-smelting seems to have come into Africa in the north, and only spread lately down to the Hottentots, who still remember in their stories the time when their ancestors used to cut down trees with stones. The Africans easily dig up their rich iron ore and smelt it with wood in simple furnaces which may be mere holes in the ground, the draught being generally by bellows. The primitive pair of bellows may there be seen, made of whole skins of goats or other animals, of which the one full of air is pressed or trodden on, while the empty one is pulled up to fill itself through a slit or valve. This shows iron-smelting not far from its rudest and probably earliest state. Among the various improvements which have now made iron more plentiful than in ancient times are the use of coke instead of charcoal for smelting; the introduction of cast iron, which seems old in China,

but was not common in England till the last century; the use of machinery for rolling and forging. The progress of steel-making has been such as lately to make it possible for railways to be laid down with steel at a penny a pound.

Other metals and their effect on civilization may be spoken of briefly. Silver has from ancient times been the companion of gold, as precious metals. Lead was easily extracted, and served the Romans for roofs and water-pipes. The alloy of copper and zinc was made by the Romans not by fusing together the two metals, but by heating copper with the zinc ore called calamine; the result was brass, an inferior kind of bronze. Quicksilver was known to the ancients, who distilled it from the red cinnabar, and understood its use in extracting gold and silver, and for gilding. Of the many metals which have become known in modern times some have practical uses. Thus platinum is valuable for vessels which have to bear extreme heat or resist the action of acids, and aluminium is useful for its remarkable lightness. But we still mostly depend on the metals whose origin is lost in antiquity—iron, copper, tin, lead, silver, and gold.

The mention of these last precious metals leads us to notice the important part which coin has had in developing civilization, and this again belongs to the general history of trade or commerce. The modern Englishman, accustomed to shops and counting-houses, hardly realises from what rude beginnings our complex commercial system arose. It is instructive to see trade in its lowest form among such tribes as the Australians. The tough greenstone, valuable for making hatchets, is carried hundreds of miles by natives who receive from other tribes in return the prized products of their districts, such as red ochre to paint their bodies with; they have even got so far as to let peaceful traders pass unharmed through tribes at war, so that trains of youths might be met, each lad with a slab of sandstone on his head to be carried to his distant home and shaped into a seed-crusher. When strangers visit a tribe, they are received at a friendly gathering or corrobboree, and presents are given on both sides. No doubt there is a general sense that the gifts are to be fair exchanges, and if either side is not satisfied there will be grumbling and quarrelling. But in this roughest kind of barter we do not yet find that clear notion of a unit of value which is the great step in trading. This higher stage is found among the

Indians of British Columbia, whose strings of haiqua-shells, worn as ornamental borders to their dresses, serve them also as currency to trade with, a string of ordinary quality being reckoned as worth one beaver's skin. In the Old World many traces have come down of the times when value was regularly reckoned in cattle; as where in the Iliad, in the description of the funeral games, we read of the great prize tripod that was valued at twelve oxen, while the female slave who was the second prize was only worth four oxen. Here the principle of unit of value is already recognised, for not only could the owner of oxen buy tripods and slaves with them, but also he who had a twelve-ox tripod to sell could take in exchange three slaves reckoned at four oxen each. To this day various objects of use or ornament pass as currency, especially where money is scarce. Thus the traveller in Abyssinia may have to buy what he wants with cakes of salt, while elsewhere in Africa he has to carry iron hoe-blades, pieces of cloth, and strings of beads as money. Cowry-shells are still small change in South Asia, as they have been since time immemorial. These things do more or less clumsily what metal money does so conveniently. The use of money arose out of gold and silver being in old times bartered by weight for goods, as may be seen in the pictures of the ancient Egyptians weighing in scales heaps of rings of gold and silver, which shows that these were not yet real money. It is thus still with much of the gold and silver traded with in the East, where the little ingots have to be weighed and reckoned for what each is worth. The invention of coin comes in when pieces of metal are made of a fixed weight and standard, and marked with a figure or inscription to certify them, so that they may be taken without weighing or testing. This looks a simple thing to do, but the old Egyptians and Babylonians are not known to have hit upon it. Perhaps the earliest money may have been the Chinese little marked cubes of gold, and the pieces of copper in the shapes of shirts and knives, as though intended to represent real shirts or knives. Coins appear in Lydia and Ægina, in their early form, as rude dumps of precious metal stamped on one side only with a symbol such as the tortoise, the other side showing the mark of the anvil or tool they were placed on to be struck, which accidental back-pattern came to be improved in later coins into the ornamental reverse. Art came on fast in coinage, so that among the most beautiful coins in the world are the gold staters of

Philip of Macedon, with the laurel-crowned head on one side and the two-horse chariot on the other. But one reason why coins are no longer struck in such high relief is because they would be rubbed down by wear. The Roman *as* was not stamped but cast; it seems to have been at first a pound of copper, its name meaning "one" (as *ace* at cards still does). From early ages the coinage has been a government monopoly, and the practice soon began of lowering the standard and lessening the weight for the profit of the royal treasury. How this debasing the coinage was carried on in Europe by one king after another may be seen in the fact that the *libra* or pound of silver came down in value to the French *livre* or franc, worth tenpence, and to the "*pound* Scots," worth twenty pence. Though changed in value, the coinage of old times may be traced on to the present day, in our still keeping accounts in the £ *s. d.* (libræ, solidi, denarii) of the Romans.

For small trading and at home, metal money answers well. But there is great trouble and risk in sending coin hundreds of miles to pay for goods bought at a distance. An easily carried substitute for gold and silver is the bank-note, a promise to pay so much, issued by the treasury or some banker, and passing as money from hand to hand. The Emperor of China appears to have issued such notes in exchange for treasure about the eighth century, and in the thirteenth century Marco Polo, the famous merchant-traveller in Tartary, describes the Great Khan's money of stamped pieces of mulberry-bark. It is plain from this account that the notion of paper-money was still strange to the mind of a European trader, but since then bank-notes have become an important part of the world's currency. Even more useful to commerce was the invention of bills of exchange. Suppose a merchant of Genoa to have sent silks to a merchant in London. He does not send for his money in return, but gives an order on a slip of paper that his correspondent in London, who owes him so much, is to pay it in so many days. This slip of paper is a bill of exchange, and is bought by another Genoese merchant who happens to owe money in London, and pays it by sending over the bill which claims the payment of the money there. Thus, instead of gold being sent backwards and forwards to pay for shipments between London and Genoa, one debt is set off against another. This is describing in its simplest form the system which is so worked in the exchanges of mercantile cities all over the

world that the immense transactions of commerce are carried on by mutual credit, with only so much actual travelling of gold and silver as is necessary to adjust the balances between the different countries.

The main principle of modern commerce is still just what it was among the rude Indians of Brazil, where the tribes who make the deadly arrow-poison prepare more than they want for their own use, so as to exchange the rest for spears of the hard wood that grows in other districts, or the hammocks of palm-fibre netted by tribes elsewhere. Wealth is created by trade as well as by manufactures. The Canadian trapper wants for his own use but few of his plentiful furs, but all he can take are wealth to him, because the trader brings him in exchange the clothes and groceries and other things he wants. The general history of commerce in the world, which is the development of this simple principle, need not be dwelt on here by giving details of the ancient traffic of Egypt with Assyria and India, the Phœnician trading colonies on the Mediterranean, the old trade-routes across Asia and Europe, the rise of the merchant princes of Genoa and Venice, the first voyages round the Cape to the East Indies, the discovery of America, the rise of ocean steam-navigation. It is specially interesting to the student of civilization to notice that the travelling merchant had in early ages another business hardly less important than conveying ivory and incense and fine linen from where they were plentiful to where they were scarce. He was the bringer of foreign knowledge and the explorer of distant regions in days when nations were more shut up than now within their own borders, or went across them only as enemies to ravage and destroy. The merchants did much to break down the everlasting jealousy and strife between nations into peaceful and profitable intercourse. Moreover it may be plainly proved that the old hostile system of nations is kept up by every kind of restriction on trade, every protective duty imposed to force the production of commodities in countries ill-suited to them, to prevent their coming in cheap and good from where they are raised with least labour. There is no agent of civilization more beneficial than the free trader, who gives the inhabitants of every region the advantages of all other regions, and whose business is to work out the law that what serves the general profit of mankind serves also the private profit of the individual man.

CHAPTER XII

ARTS OF PLEASURE

Poetry, 45—Verse and Metre, 45—Alliteration and Rhyme, 46—Poetic Metaphor, 47—Speech, Melody, Harmony, 47—Musical Instruments, 49—Dancing, 52—Drama, 53—Sculpture and Painting, 55—Ancient and Modern Art, 56—Games, 59.

To those who have not thought particularly about straightforward prose talk, and poetry which is set in metre and rhyme, and song which is chanted to a tune, it may seem that these are three clearly distinct things. But on careful examination it is found that they shade into one another, and it can be made out how human speech passed into all three states. Savage tribes have some set form in their chants, which shows they feel them different from common talk. Thus Australians, to work themselves into fury before a fight, will chant, "Spear his forehead!—Spear his breast!—Spear his liver!—Spear his heart!" and so on with the other parts of the enemy's body. Another Australian chant is sung at native funerals, the young women taking the first line, the old women the second, and all together the third and fourth.

"Kardang garro
Mammul garro
Mela nadjo
Nunga broo."

"Young-brother again
Son again
Hereafter I-shall
See never."

Here the words of the savage chant are no longer mere prose, but have passed into a rude kind of verse. All barbaric tribes hand down such songs by memory, and make new ones. The North American hunter has chants which will bring him on the bear's track next morning, or give him victory over an enemy. The following is the translation of a New Zealand song:—

"Thy body is at Waitemata,
But thy spirit came hither
And aroused me from my sleep.
Chorus—Ha-ah, ha-ah, ha-ah, ha!"

This last shows a feature extremely common in barbaric songs, the refrain of generally meaningless syllables. We moderns are often struck with the absurdity of the nonsense-chorus in many of our own songs, but the habit is one which seems to have been kept up from the stages of culture in which the Australian savage sings "Abang! abang!" over and over at the end of his verse, or a Red Indian hunting-party enjoy singing in chorus "Nyah eh wa! nyah eh wa!" to an accompaniment of rattles like those which children use with us.

It is among nations at a higher stage of culture that there appears regular metre, where the verses are measured accurately in syllables. The ancient hymns of the Veda are in regular metre, and this is proof how far the old Aryans had advanced beyond the savage state. Indeed the resemblances between the metre of the most ancient Indian and Persian and Greek poetry show that in the remote ages of their national connection their measured verse had already begun. Metre is best known to us from Greek and Latin verses, but there are more metres in the world than Horace knew of. For instance, when Longfellow versified a collection of American native tales in his "Song of Hiawatha," he found no metre among the Indians themselves, who were not cultured enough to have such a device; so he imitated the peculiar metre of the Kalewala, the epic poem chanted by the native bards of Finland. Our own poetry, where the verses are scanned by accent, differs in its nature from the classic metres whose syllables are measured by quantity or length. Later than the invention of metre, came other means by which the poet could please his hearers with new effects of matched and balanced sounds. Thus our early English forefathers rejoiced in alliteration, where the same consonant comes in again and again, with a frequency which would weary our modern taste, though our ear is pleased with occasional touches of it, as

"Sober he seemde, and very sagely sad."—SPENSER.

"He rushed into the field, and, foremost fighting, fell."—BYRON.

Rhyme, too, seems comparatively modern in the world's history of poetry. Its clumsy beginnings may be judged from such lines as these of an old Latin poet (perhaps Ennius) quoted by Cicero :—

"Cœlum nitescere, arbores frondescere,
Vites lætificæ pampinis pubescere,
Rami bacarum ubertate incurvescere."

Thus the Christian hymns of the Middle Ages, such as the famous "Dies Iræ," did not bring in rhyme as quite a novelty, but they used it skilfully and made it common, and it was taken up also by the Troubadours, the masters and teachers of Europe in the poetic art.

The best poetry of our own day is full of quaint fancy and delicate melody, the setting of lovely thought in harmonious language, at once pictures for the imagination and music for the ear. But besides this, it has a curious interest to the student of history, as keeping alive in our midst the ways of thought of the most ancient world. Much of poetic art lies in imitating the expressions of earlier stages of culture, when poetry was the natural utterance of any strong emotion, the natural means to convey any solemn address or ancestral tradition. The modern poet still uses for picturesqueness the metaphors which to the barbarian were real helps to express his sense. This may be seen in analyzing a poem of Shelley's :—

"How wonderful is Death,
Death and his brother, Sleep!
One, pale as yonder waning moon,
With lips of lurid blue;
The other, rosy as the morn
When throned on ocean's wave
It blushes o'er the world."

Here the likeness of death and sleep is expressed by the metaphor of calling them brothers, the moon is brought in to illustrate the notion of paleness, and the dawn of redness; while to convey the idea of the dawn shining over the sea the simile of its sitting on a throne is introduced, and its reddening is compared on the one hand to a rose, and on the other to blushing. Now this is the very way in which early barbaric man, not for poetic affectation, but simply to find the plainest words to convey his thoughts, would talk in metaphors taken from nature. Even our daily prose is full of words, now come down to ordinary use, which show vestiges of this old nature-poetry, and the etymologist may, if he will, set up again the pictures of the old poetic thoughts which made the words.

To read or recite poetry as we moderns do is to alter its proper nature, for the purpose of poetry was to be chanted. But this very chanting or singing grew out of talking. On listening carefully to the talk going on around us, we may observe that it does not run in an

unchanged monotone, but that all sentences are intoned to an imperfect tune, a rise and fall of pitch marking the phrases, distinguishing question and answer, and touching emphatic words with a musical accent. This half-melody of common speech may be roughly written down in notes; it is not the same in English and German; and indeed one way in which a Scotchman's talking is known from an Englishman's is the different intoning of his phrases. When speech becomes solemn or impassioned, it passes more and more into natural chanting, which at devotional meetings may be heard nearly passing into distinct tune. The intoning in churches arose from the same natural utterance of religious feeling, but in course of time it became fixed by custom, and was forced into the regular intervals of the musical scale. So the artificial recitative of the opera is a modern musical working up of what has come down by tradition of the ancient tragic declamation, which once swayed the listening throng of the Greek theatre.

We are apt to take it as a matter of course that all music must be made up of notes in scale, and that scale the one we have been used to from childhood. But the chants of rude tribes, which perhaps best represent singing in its early stages, run in less fixed tones, so that it is difficult to write down their airs. The human voice is not bound to a scale of notes, for its pitch can glide up and down. Nor among nations who sing and play by musical scales are the tones of these scales always the same. The question how men were led to exact scales of tones is not easy to answer fully. But one of the simplest scales was forced upon their attention by that early musical instrument the trumpet, rude forms of which are seen in the long tubes of wood or bark blown by forest tribes in South America and Africa. A trumpet (a six-feet length of iron gas pipe will do) will sound the successive notes of the "common chord," which may be written *c e g c*, on which the trumpeter performs the simple tunes known so well as trumpet-calls. This natural scale, perfect so far as it goes, contains the most important of musical intervals, the octave, fifth, fourth, and third. Another scale, of more notes than this, though of fewer than our full scale, is not less familiar to English ears. This is the old five-tone scale, without semitones, which can be played on the five black keys of the pianoforte, and the best-known form of which may be written *c, d, e, g, a, c*. Old Scotch airs are on the five-tone scale,

which indeed may still be met with across the world, as where some traveller in China watching a funeral procession has been surprised to hear a melancholy dirge like what he last heard played by a piper on the shore of a Highland loch. Engel, in his *Music of Ancient Nations*, shows that music of this pentatonic or five-toned kind has belonged since early times to other Eastern nations, so that any genuine Scotch melody like "Auld Lang-syne" may give some idea of the music of antiquity. The more advanced seven-tone scale which prevails in the modern world is nearly taken from that of the musicians of classic Greece, who accompanied the singer's voice on the eight-stringed lyre. Pythagoras, who first brought musical tones under arithmetical rule, had the curious fancy that the distances of the seven planets are related as the seven tones of the octave, an idea which still dimly survives among us in the phrase "music of the spheres."

Modern music is thus plainly derived from ancient. But there has arisen in it a great new development. The music of the ancients scarcely went beyond melody. The voice might be accompanied by an instrument in unison or at an octave interval, but harmony as understood by modern musicians was as yet unknown. Its feeble beginnings may be traced in the Middle Ages, when musicians were struck by the effects got by singing two different tunes at once, when one formed a harmony to the other. It is still a joke among musicians to sing together in this old-fashioned way two absurdly incongruous tunes, for instance, "The Campbells are coming" and "The Vesper hymn," so arranged that one makes a sort of accompaniment to the other. The old rounds and catches, still popular, thus make one part of the tune serve as a harmony for the other. The Roman church part-music, and the Protestant singing by the congregation, with the organ to accompany them, had great effect in making the change by which the mere melody of the ancients grew into the harmonized melody of the moderns. This great step once understood, the student can follow in the history of music its successive stages in part-singing and orchestral composition, in the church and the concert-room, till in the hands of the great composers of the last three centuries the full resources of modern musical art were developed.

The musical instruments of the present day may all be traced back to rude and early forms. The rattle and the

drum are serious instruments among savages; the rattle has come down to a child's toy with us, but the drum holds its own in peace and war. Above these monotonous instruments comes the trumpet, which, as has just been seen, brings barbaric music a long step further on. The pipe or flageolet appears in its simplest form in the common whistle, and is improved by holes, by which the player alters the length of the pipe so as to give several notes. From very remote times, and far and wide over the earth, the familiar pipe is found, played single or double, and sometimes blown with the nostril instead of the mouth. Already in the ancient world it was often provided with a skin wind-bag which made it into the bagpipe; or, held sideways and blown across the mouth-hole, it became the flute. Another way of bringing out a range of notes is seen in the Pan's pipes, the row of reeds of different lengths, in old classic days associated with the grace of rural poetry, but now come down to sound the vulgar pipings of the street showman. In the modern orchestra, the cornet is a trumpet provided with stops. The clarionet is a development of the grass-stem with a vibrating slit or tongue such as children cut in the fields in spring. The whole class of musical instruments to which the harmonium belongs work with these vibrating tongues, which by their name of "reeds" still keep up the memory of their origin. The organ carries out in the widest range and grandest proportions the principle of the simple pipe or whistle, so that there is scientific correctness in the disrespectful name of "kist o' whistles" given it by the Scotch, who disliked its use in church. Not less primitive are the rudest forms in which stringed instruments appear. It is told in the Odyssey (xxi. 410) how the avenging hero, when he has strung his mighty bow compact of wood and horn, gives the stretched string a twang that makes it sing like a swallow in a soft tone beautifully. One might well guess that the strung bow of the warrior would naturally become a musical instrument, but, what is more, it really is so used. The Damara in South Africa finds pleasure in the faint tones heard by striking the tight bowstring with a little stick. The Zulu despises the bow as a cowardly weapon, but he still uses it for music; his music-bow, shown in Fig. 75 *a*, has a ring slid along the string to alter the note, and is also provided with a hollow gourd acting as a resonator or sounding-box to strengthen the feeble twang. Next, looking at *b* in the figure, it is

seen how the ancient Egyptian harp may have been developed from such a rude music-bow, the wooden back being now made hollow so as to be bow and resonator in one, while across it are strung several strings of different lengths. All ancient harps, Assyrian, Persian, even old Irish, were made on this plan, yet we can see at a glance that it was defective, the bending of the wooden back putting the strings out of tune. It was not till modern

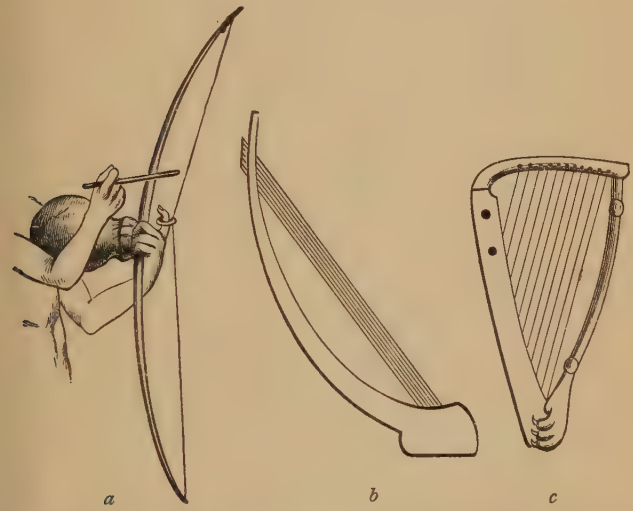

FIG. 75.—Development of the Harp, *a*, music-bow with gourd resonator (South Africa); *b*, ancient harp, (Egypt); *c*, mediæval harp with front-pillar (England).

ages that the improvement was made of completing the harp with the front-pillar, as seen in *c*, which makes the whole frame rigid and firm. Looking at the three figures, it is seen how the course of invention was by gradual growth; the harp with the pillar could not have been first invented, for no men could have been so stupid as to go on making harps and leave out the front-pillar when once the idea of it had come into their minds. The harp, though now made more perfect than of old, is losing its ancient place in music; but the reason of this is easy

to see: it has been supplanted by modern instruments which have come from it. The very form of a grand piano shows that it is a harp laid on one side in a case, and its strings not plucked with the fingers but struck with hammers worked from a keyboard. It is the latest development from the bowstring of the præhistoric warrior.

Dancing may seem to us moderns a frivolous amusement; but in the infancy of civilization it was full of passionate and solemn meaning. Savages and barbarians dance their joy and sorrow, their love and rage, even their magic and religion. The forest Indians of Brazil, whose sluggish temper few other excitements can stir, rouse themselves at their moonlight gatherings, when, rattle in hand, they stamp in one-two-three time round the great earthen pot of intoxicating kawi-liquor; or men and women dance a rude courting dance, advancing in lines with a kind of primitive polka step; or the ferocious war-dance is performed by armed warriors in paint, marching in ranks hither and thither with a growling chant terrific to hear. We have enough of the savage left in us to feel how Australians leaping and yelling at a corrobboree by firelight in the forest can work themselves up into frenzy for next day's fight. But with our civilized notions it is not so easy to understand that barbarians' dancing may mean still more than this; it seems to them so real that they expect it to act on the world outside. Thus among the Mandan Indians, when the hunters failed to find the buffaloes on which the tribe depended for food, every man brought out of his lodge the mask made of a buffalo's head and horns, with the tail hanging down behind, which he kept for such an emergency, and they all set to dance buffalo. Ten or fifteen masked dancers at a time formed the ring, drumming and rattling, chanting and yelling; when one was tired out he went through the pantomime of being shot with bow and arrow, skinned, and cut up; while another, who stood ready with his buffalo-head on, took his place in the dance. So it would go on, without stopping day or night, sometimes for two or three weeks, till at last these persevering efforts to bring the buffalo succeeded, and a herd came in sight on the prairie. The description and sketch of the scene will be found in Catlin's *North American Indians*. Such an example shows how, in the fower levels of culture, men dance to express their leelings and wishes. All this explains how in ancient

religion dancing came to be one of the chief acts of worship. Religious processions went with song and dance to the Egyptian temples, and Plato said that all dancing ought to be thus an act of religion. In fact, it was so to a great extent in Greece, as where the Cretan chorus, moving in measured pace, sang hymns to Apollo, and in Rome, where the Salian priests sang and danced, beating their shields, along the streets at the yearly festival of Mars. Modern civilization, in which sacred music flourishes more than ever, has mostly cast off the sacred dance. To see this near its old state the traveller may visit the temples of India, or among the lamas of Tibet watch the mummers in animal masks dancing the demons out, or the new year in, to wild music of drums and shell-trumpets. Remnants of such ceremonies, come down from the religion of England before Christian times, are still sometimes to be seen in the dances of boys and girls round the Midsummer bonfire, or of the mummers at Yuletide; but even these are dying out. The dances of choristers in plumed hats and the dress of pages of Philip III.'s time, still performed before the high altar of Seville Cathedral, are now among the quaintest relics of a rite all but vanished from Christendom. Even sportive dancing, as a graceful exercise, is falling off in the modern world. The pictures from ancient Egypt show that the professional dancers were already skilful in their art, which perhaps reached its highest artistic pitch in classic Greece and Rome. Something of the old-fashioned picturesque village-dancing may still be seen at festivals in most countries of Europe except England, but the ball-room dances of modern society have lost much of the old art and grace.

At low levels in civilization it is clear that dancing and play-acting are one. The North American dog-dance and bear-dance are mimic performances with ludicrously faithful imitations of the creatures' pawing and rolling and biting. So the scenes of hunting and war furnish barbarians with subjects for dances, as when the Gold Coast negroes have gone out to war, and their wives at home dance a fetish-dance in imitation of battle, to give their absent husbands strength and courage. Historians trace from the sacred dances of ancient Greece the dramatic art of the civilized world. Thus, in the festivals of the Dionysia, the wondrous life of the Wine-god was danced and sung, and from its solemn hymns and laughable jests arose tragedy and comedy. In the

classic ages the player's art divided into several branches. The pantomimes kept up the earliest form, where the dancer acted in dumb show such pieces as the labours of Herakles, or Kadmos sowing the dragon's teeth, while the chorus below accompanied the play by singing the story; the modern pantomime ballets, which keep up remains of these ancient performances, show how grotesque the old stage gods and heroes must have looked in their painted masks. In Greek tragedy and comedy the business of the dancers and chorus was separated from that of the actors, who recited or chanted each his proper part in the dialogue, so that the player could now move his audience by words of passion or wit, delivered with such tone and gesture as laid hold on all who listened and looked. Greek tragedy, once begun, soon reached its height among the fine arts, so that the plays of Æschylos and Sophokles are read as examples of the higher poetry, and the modern acted imitations like the Phèdre of Racine give an idea of their power when the genius of the actors can rise to their height of emotion. The modern drama belongs not so much to the sacred mystery-plays of the Middle Ages as to the classic revival or renaissance of four centuries ago. Those who have seen the ruins of classic theatres at Syracuse, or on the hill-side of Tusculum, will best understand how a modern playhouse shows its Greek origin not only in the arrangement, but in the Greek names of its parts—the *theatre*, or spectators' place, which still keeps its well-planned horse-shoe shape; the *scene* with its painted background and curtain in front; while the *orchestra* or dancing-place, which was formerly for the *chorus*, is now given up to the musicians. The change in the *tragedy* and *comedy* performed in the modern theatre from those of the classic world is partly due to their having dropped the stiff solemn declamation which belonged to them while they were still religious ceremonies, and their personages divine. In the hands of modern dramatists, of Shakspere above all, the characters came to be more human, though representing human nature in its most picturesque extremes, and life in its intensest moments. Modern plays are not indeed bound to be strictly natural, but can still call in the supernatural, as where now fairies or angels may hover over the scene where in classic days the gods used to pass in mid-air borne in their machines. In the modern comedy the persons dress and talk as near as may be like daily life; yet, even here, when the

audience gravely fall in with the pretence that some of the speeches, though spoken aloud, are "asides" not heard by the actors close by, this shows that the modern world has not lost the power to make-believe, on which all dramatic art is founded.

On this same power of make-believe or imagination are founded the two other fine arts, sculpture and painting. Their proper purpose is not to produce exact imitations, but what the artist strives to bring out is the idea that strikes the beholder. Thus there is often more real art in a caricature done with a few strokes of the pencil, or in a rough image hacked out of a log, than in a minutely painted portrait, or a figure at a waxwork show which is so like life that visitors beg its pardon when they walk up against it. The painter's and sculptor's art seems to have arisen in the world from the same sort of rude beginnings which are still to be seen in children's attempts to draw and carve. The sheets of bark or skins on which barbarous tribes have drawn men and animals, guns and boats, remind us of the slates and barn-doors on which English children make their early trials in outline. Many of these children will grow up and go through their lives without getting much beyond this childish stage. The clergyman of a country parish some years ago set the cottagers to amuse themselves with carving in wood such figures as men digging or reaping. They produced figures so curiously uncouth, and in style so like the idols of barbarous tribes, that they were kept as examples of the infancy of sculpture, and are now to be seen in the museum of Kew Gardens. Yet mankind, under favourable circumstances, especially with long leisure time on their hands, began in remote antiquity to train themselves to skill in art. Especially the sketches and carvings of animals done by the old cave-men of Europe have so artistic a touch that some have supposed them modern forgeries. But they are admitted to be genuine and found over a wide district, while forgeries which have been really done to palm off on collectors are just wanting in the peculiar skill with which the savages who lived among the reindeer and mammoths knew how to catch their forms and attitudes. Two of these ancient carvings are drawn in Figs. 3 and 4, and others in Lubbock's *Prehistoric Times*. The art of colouring would naturally arise, for savages who paint their own bodies with charcoal, pipeclay, and red and yellow ochre, would daub their carved figures and fill in their outline drawings with

the same colours. Travellers in Australia sheltering from the storm in caves, wonder at the cleverness of the rude frescoes on the cavern-walls of kangaroos and emus and natives dancing, while in South Africa the Bushmen's caves show paintings of themselves with bows and arrows, and the bullock-waggons of the white men, and the dreaded figure of the Dutch boer with his broad-brimmed hat and pipe. Among such people as the West Africans and Polynesians, the native sculptor's best skill has been used on images of demons and gods, made to receive worship and serve as bodies in which the spiritual beings are to take up their abode. Thus the idols of barbarians, as specimens of early stages of sculpture, have a value in the history of art as well as of religion.

In the ancient nations of Egypt and Babylonia art had already risen to higher levels. Indeed Egyptian sculpture reached its best in the earlier rather than the later ages, for the stone statues of the older time stand and step with more free life in their limbs, and the calm proud faces of the colossal Thothmes and Rameses portraits (like Fig. 19) show the grandest ideal of an eastern despot, half tyrant, half deity. In the sculpture halls of the British Museum, it is seen that the early school of Egyptian sculptors were on their way to Greek perfection, but they stopped short. With trained mechanical skill they wrought statues by tens of thousands, hewing gigantic figures of the hardest granite and porphyry which amaze the modern stone-cutter, but their art, bound by tradition, grew not freer but more stiff and formal. They might divide their plans into measured squares, and set out faces and limbs by line and rule, but their conventional forms seldom come up to the Greek lines of beauty, and their monuments are now prized, not as models of art, but as records of old-world history. In the British Museum also, the alabaster bas-reliefs that adorned the palace-courts of Nineveh give a wonderfully clear idea of what Assyrian life was like, how the king rode in his chariot, or let fly his arrows at the lion at bay, or walked with the state umbrella held over his head; how the soldiers swam the rivers on blown skins and the storming party scaled the fortress, while the archers shot down among them from the battlements, and the impaled captives hung in rows full in view outside the walls. But in such scenes proportion did not much matter if only the meaning were conveyed. It did not seem artistically absurd to the Assyrians to make archers

so big that two fill a whole parapet; nor did the Egyptians feel the comic impression made on our modern minds by the gigantic figure of the king striding half across the battle-field and grasping a dozen pigmy barbarians at a grip, to slash their heads off with one sweep of his mighty falchion. It was in Greece that the rules of art were developed which reject the figures of the older nations as stiff in form and unlifelike in grouping. Greek art is sometimes written of as though it had itself begun in the rudest stage, with clumsy idols of wood and clay, till by efforts of their own surpassing genius the Greek sculptors came to hew in marble the forms which are still the wonders of the world. But great as Greek genius was, it never did this. The Greek nations had been for ages in contact with the older civilizations of the Mediterranean; their starting-point was to learn what art could do in Egypt, Phœnicia, Babylonia, and then their genius set them free from the hard old conventional forms, leading them to model life straight from nature, and even to fashion in marble shapes of ideal strength and grace. The Egyptian sculptors would not spoil polished granite with paint, but many of their statues were coloured, and there are traces of paint left on the Assyrian sculptures and on Greek statues, so that we are apt to have a wrong idea of a Greek temple, as though its marble gods and goddesses used to be of the glaring whiteness of a modern sculpture-gallery. The Greek terra-cotta statuettes in the British Museum are models of antique female grace in form and costume, only wanting the lost colour restored to make them the prettiest things in the world.

In colour-drawing, or painting, the Egyptian wall-paintings show a style half-way between the lowest and the highest. Here the scenes of old Egyptian life are caught at their characteristic moments, the shoemaker is seen drawing his thread, the fowler throwing at the ducks, the lords and ladies feasting and the flute-players and tumblers performing before them. Yet with all their clever expressiveness, the Egyptian paintings have not quite left behind the savage stage of art. In fact they are still picture-writings rather than pictures, repeating rows of figures with heads, legs, and arms drawn to pattern, and coloured in childish daubs of colour—hair all black, skin all red-brown, clothing white, and so on. The change from these to the Greek paintings is surprising; now we have no more rows of man-patterns, but grouped studies of real men. The best works of the Greek

painters are only known to moderns by the admiring descriptions of the ancients, but more ordinary specimens which have been preserved give an idea what the paintings of Zeuxis and Apelles may have been. The tourist visiting for the first time the museum of Naples comes with a shock of surprise in face of Alexander of Athens' picture of the goddesses at play, the boldly drawn frescoes of scenes from the Iliad, and the groups of dancers elegant in drawing and colouring. Most of these pictures from Herculaneum and Pompeii were done by mere house decorators, but these tenth-rate Greek painters had the traditions of the great classic school, and they show plainly that from the same source we also have inherited the art of design. Modern European painting comes in two ways from ancient art. On the one hand, Greek painting spread over the Roman Empire and into the East, and for ages found its chief home in the Christian art of Constantinople, whence arose the Byzantine style, often called pre-Raffaelite, which though wanting in the older freedom of classic Athens, was expressive and rich in colour. On the other hand, when in the fifteenth century the knowledge of classic art and thought revived in Europe, the stiff pictures of saints and martyrs gave place to more natural and graceful forms, and modern painting arose under Raffaelle and Michael Angelo, Titian and Murillo, in whom the two streams from the fountain-head of Greek art, so long separated, joined again. The ancients mostly painted on walls like the present fresco-painting, or on waxed wooden panels; they did not know the use of oil to mix the ground colours with. This is just mentioned in the tenth century, so that the story of the brothers Van Eyck inventing oil-painting in the fifteenth century is not quite true. But they turned it to practical use, and from their time painters brought the substance and play of colour to a perfection which there is no reason to suppose the ancients ever approached. In modern times water-colour painting, used by the old masters for light sketches and studies, has also become an art of itself, especially in England. One branch of painting in which the moderns unquestionably surpass the ancients is landscape. Of old, however admirably the figures might be drawn, the hard conventional mountains, forests, and houses behind were still in the picture-writing stage, they rather stood as signs of the world outside than depicted it as it is. But now the artist's eyes are turned on nature, which he

enders with a truthfulness unknown to the old masters who first gave living form to gods and heroes, apostles and martyrs.

Something has now to be said of games, for play is one of the arts of pleasure. It is doing for the sake of doing, not for what is done. One class of games is spontaneous everywhere, the sports in which children imitate the life they will afterwards have to act in earnest. Eskimo children play at building snow huts, and their mothers provide them with a tiny oil-lamp with a bit of wick to set burning inside. Among the savages whose custom it is to carry off their wives by force from neighbouring tribes, the children play at the game of wife-catching, just as with us children play at weddings with a clergyman and bridesmaids. All through civilization, toy weapons and implements furnish children at once play and education; the North American warrior made his boy a little bow and arrow as soon as he could draw it, and the young South Sea Islander learnt by throwing a reed at a rolling ring how in after-life to hurl his spear. It is curious to see that when growing civilization has cast aside the practical use of some ancient contrivance, it may still survive as a toy, as where Swiss children to this day play at making fire by the old-world plan of drilling one piece of wood into another; and in our country lanes the children play with bows and arrows and slings, the serious weapons of their forefathers.

It is not quite easy to say whether man in a low savage state ever goes beyond these practical sports, and invents games of mere play. But higher up in civilization, such games are known from very ancient times. A trifling game, if it exactly takes hold of the playful mind, may last on in the world almost for ever. The ancient Egyptians, as their old paintings show, used to play our childish game of hot-cockles, where the blind-man who stoops down has to guess who thumped him on the back. These Egyptians played also the game of guessing the sum of the fingers held up by the two players, which is still popular in China, and in Italy, where one hears it half the night through with shouts of "three!" "seven!" "five!" "*mora!*"; it is a pity we have not this as a children's game in England, for it trains a sharp eye and a quick hand. While some of our games, such as hoops and whipping-tops, have gone on in the Old World for thousands of years, others are modern importations; thus it was only about Stuart times that English

children learnt from the Chinese, or some other nation in the Far East, the art of flying kites. Or modern sports may be late improvements on old ones; the split shank-bones fastened under the shoes for going on the ice delighted the London 'prentices for centuries before they were displaced by steel skates. How a game may sometimes go on for ages unchanged, and then suddenly turn into a higher form, is curiously seen in the game of ball. The ancients tossed and caught balls like children now, and a famous Greek and Roman lad's game was "common ball," where there were two sides, and each tried to get the ball and throw it to the opposite goal. This is still played in a few country-places in England; its proper name is "hurling," and football with the great leather ball is a variety of it. The ancients never seem to have used a stick or bat in their ball-play. But some 1,000 or 1,500 years ago the Persians began to play ball on horseback, which of course could only be done with a long stick, mallet, or racket; in this way there came into existence the fine sport of *chaugán*, which has lasted ever since in the East, and lately established itself in England under the name of *polo*. When once the club or racket had been invented for horseback, it was easy to use it on foot, and thus in the Middle Ages there began the whole set of games in which balls are hit with bats, such as pall-mall and croquet, tennis, hockey and golf, rounders and cricket.

Indoor games, too, have their curious history. Throwing lots or dice is far too ancient for any record to remain of its beginning, and the very draught-boards and men which the old Egyptians used to play on are still to be seen. The Greeks and Romans were draught-players, but their games were not like our modern game of draughts. On the other hand our merells or morris belongs to an old classical group of games, and Ovid alludes to the childish game of tit-tat-to. These games are played in China as well, and it is not known at which end of the earth they were first devised. The great invention in intellectual games may have been made a thousand years or so ago, when some Hindu, whose name is lost, set to work upon the old draught-board and men, and developed out of them a war-game, where on each side a king and his general, with elephants, chariots, and cavalry, and the foot-soldiers in front, met in battle array. This was the earliest chess, which with some little change passed into the modern European chess that

still holds pre-eminence among sports, taxing the mind to its utmost stretch of foresight and combination. Our modern draughts is a sort of simplified chess, where the pieces are all pawns till they get across the board and become queens. The story in the history-books that cards were invented in France to amuse Charles VI. is a fiction, for they were known in the East centuries earlier. But at any rate the Europeans make with them combinations of skill and chance which excel anything contrived by their Asiatic inventors. Games which exercise either body or mind have been of high value in civilization as trainers of man's faculties. Games of pure chance played for money stand on quite a different footing; they have been from the first a delusion and a curse. In our own time, there is perhaps no more pitiable sign of the slowness with which scientific ideas spread, than to hear the well-dressed crowds round the gaming-table at Monaco talking about runs of luck, and fancying that it makes a difference whether one backs the black or the red. This goes on although schoolboys are now taught the real doctrine of chances, and how to reckon the fixed percentage of each week's stakes that will be raked in by the croupier, and not come back.

CHAPTER XIII

SCIENCE

Science, 62—Counting and Arithmetic, 62—Measuring and Weighing, 67—Geometry, 68—Algebra, 72—Physics, 73—Chemistry, 76—Biology, 77—Astronomy, 79—Geography and Geology, 82—Methods of Reasoning, 83—Magic, 84.

SCIENCE is exact, regular, arranged knowledge. Of common knowledge savages and barbarians have a vast deal, indeed the struggle of life could not be carried on without it. The rude man knows much of the properties of matter, how fire burns and water soaks, the heavy sinks and the light floats, what stone will serve for the hatchet and what wood for its handle, which plants are food and which are poison, what are the habits of the animals that he hunts or that may fall upon him. He has notions how to cure, and much better notions how to kill. In a rude way he is a physicist in making fire, a chemist in cooking, a surgeon in binding up wounds, a geographer in knowing his rivers and mountains, a mathematician in counting on his fingers. All this is knowledge, and it was on these foundations that science proper began to be built up, when the art of writing had come in and society had entered on the civilized stage. We have to trace here in outline the rise and progress of science. And as it has been especially through counting and measuring that scientific methods have come into use, the first thing to do is to examine how men learnt to count and measure.

Even those who cannot talk can count, as was well shown by the deaf-and-dumb lad Massieu, who wrote down among the recollections of his childhood before the Abbé Sicard educated him, "I knew the numbers before my instruction; my fingers had taught me them." We ourselves as children began arithmetic on our fingers and now and then take to them still, so that there is no difficulty in understanding how a savage whose language has no word for a number above three will manage to reckon perhaps a list of fifteen killed and wounded, how he will check off one finger for each man, and at last hold

up his hand three times to show the result. The next question is, how numeral words came to be invented. This is answered by many languages, which show in the plainest way how counting on fingers and toes led to making numerals. When a Zulu wants to express the number six, he says *tatisitupa*, which means "taking the thumb;" this signifies that the speaker has counted all the fingers of his left hand, and begun with the thumb of the right. When he comes to seven, for instance when he has to express that his master bought seven oxen, he will say *u kombile*, that is, "he pointed"; this signifies that in counting he had come to the pointing-finger or forefinger. In this way the words "hand," "foot," "man," have in various parts of the world become numerals. An example how they are worked may be taken from the language of the Tamanacs of the Orinoco; here the term for five means "whole hand," six is "one of the other hand," and so on up to ten or "both hands"; then "one to the foot" is eleven, and so on to "whole foot" or fifteen, "one to the other foot" or sixteen, and thence to "one man," which signifies twenty, "one to the hands of the next man" being twenty-one, and the counting going on in the same way to "two men" which stands for forty, &c. &c. Now this state of things teaches a truth which has sometimes been denied, that the lower races of men have, like ourselves, the faculty of progress or self-improvement. It is evident that there was a time when the ancestors of these people had in their languages no word for fifteen or sixteen, nor even for five or six, for if they had they could not have been so stupid as to change them for their present clumsy phrases about hands and feet and men. We see back to the time when, having no means of reckoning such numbers except on their fingers and toes, they found they had only to describe in words what they were doing, and such a phrase as "both hands" would serve them as a numeral for ten. Then they would keep up these as numerals after their original sense was lost, like the Vei negroes who called the number twenty *mo bande*, but had forgotten that this must have meant "a person finished." The languages of nations long civilized seldom show such plain meaning in their numerals, perhaps because they are so ancient and have undergone such change. But all through the languages of the world, savage or civilized, with exceptions too slight to notice here, there is ineffaceable proof that the numerals

arose out of the primitive counting on fingers and toes. This always led men to reckon by fives, tens, and twenties, and so they reckon still. The quinary kind of counting (by fives) is that of tribes like the negroes of Senegal, who count one, two, three, four, five, five-one, five-two, &c.; we never count numbers thus in words, but we write them so in the Roman numerals. The decimal counting (by tens) is the most usual in the world, and our ordinary counting is done by it, thus eighty-three is "eight tens and three." The vigesimal counting (by twenties), which is the regular mode in many languages, has its traces left in the midst of the decimal counting of civilized Europe, as in English "fourscore and three," French "quatre-vingt trois," that is "four twenties and three." Thus it can hardly be doubted that the modern world has inherited direct from primitive man his earliest arithmetic worked on nature's counting-board—the hands and feet. This also explains (p. 14) why the civilized world uses a numeral system based on the inconvenient number ten, which will not divide either by three or four. Were we starting our arithmetic afresh, we should more likely base it on the duodecimal notation, and use dozens and grosses instead of tens and hundreds.

To have named the numbers was a great step, but words hardly serve beyond the very simplest arithmetic, as any one may satisfy himself by trying to multiply "seven thousand eight hundred and three" by "two hundred and seventeen" in words, without helping himself by turning them in thought into figures. How did men come to the use of numeral figures? To this question the beginning of an answer may be had from barbaric picture-writing, as where a North American warrior will make four little marks //// to show that he has taken four scalps. This is very well for the small numbers, but becomes clumsy for higher ones. So already when writing was in its infancy, the ancients had fallen upon the device of making special marks for their fives, tens, hundreds, &c., leaving the simple strokes to be used only for the few units over. This is well seen in Fig. 76 which shows how numeration was worked in ancient Egypt and Assyria. Nor has this old method died out in the world, for the Roman numerals I., V., X., L., still in common use among ourselves, are arranged on much the same principle. Another device, which arose out of the alphabet, was to take the letters in their order to stand for numbers. Thus the sections

of Psalm CXIX. are numbered by the letters of the Hebrew alphabet, and the books of the Iliad by the letters of the Greek alphabet. By these various plans the arithmetic of the ancient civilized nations made great progress. Still their numeration was very cumbrous in comparison with that of the modern world. Let us put down MMDCLXIX. and multiply by CCCXLVIII., or $\beta\chi'\xi'\theta'$ by $\tau'\mu'\eta$, and a few minutes' trial will not fail to convince us of the superiority of our ciphers.

To understand how the art of ciphering came to be invented, it is necessary to go back to a ruder state of things. In Africa, negro traders may be seen at market reckoning with pebbles, and when they come to five, putting them aside in a little heap. In the South Sea

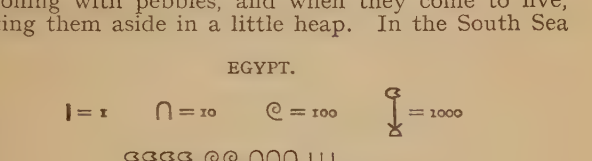

FIG. 76.—Ancient Egyptian and Assyrian numeration.

Islands it has been noticed that people reckoning, when they came to ten, would not put aside a heap of ten things, but only a single bit of coco-nut stalk to stand for ten, and then a bigger piece when they wanted to represent ten tens or a hundred. Now to us it is plain that this use of different kinds of markers is unnecessary, but all that the reckoner with little stones or beans has to do, is to keep separate his unit-heap, his ten-heap, his hundred-heap, &c. This use of such things as pebbles for "counters," which still survives in England among the ignorant, was so common in the ancient world, that the Greek word for reckoning was *psēphizein*, from *psēphos*, a pebble, and the corresponding Latin word was *calculare* from *calculus*, a pebble, so that our word *calculate* is a relic of very early arithmetic. Now to work such pebble-counting in an orderly manner, what is

wanted is some kind of abacus or counting-board with divisions. These have been made in various forms, as the Roman abacus with lines of holes for knobs or pegs, or the Chinese swan-pan with balls strung on wires, on which the native calculators in the merchants' counting-houses reckon with a speed and exactness that fairly beats the European clerk with his pencil and paper. It may have been from China that the Russian traders borrowed the ball-frame on which they also do their accounts, and it is said that a Frenchman noticing it in Russia at the time of Napoleon's invasion was struck with the idea that it would serve perfectly to teach little children arithmetic; so he introduced it in France, and thence it found its way into English infants' schools. Now whatever sort of abacus is used, its principle is always the same, to divide the board or tray into columns, so that in one column the stones, beans, pegs, or balls, stand for units, in the next column they are tens, in the next hundreds, and so on, Fig. 77. Here the three stones in the right-hand column stand for 3, the nine in the next column for 90, the one in the fourth column for 1,000, and so on. The next improvement was to get rid of the troublesome stones or beans, and write down numbers in the columns, as is here shown with Greek and Roman numerals. But now the calculator could do without the clumsy board, and had only to rule lines on his paper, to make columns for units, tens, hundreds, &c. The reader should notice that it is not necessary to the principle of the abacus that each column should stand for ten times the one next it. It may be twelve or twenty or any other number of times, and in fact the columns in our account-books for £ *s. d.* or *cwts. qrs. lbs.*, are surviving representatives of the old method of the abacus. Such reckoning had still the defect that the numbers could not be taken out of the columns, for even when each number from one to nine has a single figure to stand for it, there would still be here and there an empty column (as is purposely left in Fig. 77) which would throw the whole into confusion. To us now it seems a very simple thing to put a sign to show an empty column, as we have learned to do with the zero or O, so that the number expressed in the picture of the abacus can be written down without any columns, 241093. This invention of a sign for nothing was practically one of the greatest moves ever made in science. It is the use of the zero which makes the difference between the old arithmetic

and our easy ciphering. We give the credit of the invention to the Arabs by using the term Arabic numerals, while the Arabs call them Indian, and there is truth in both acknowledgments of the nations having been scholars in arithmetic one to the other. But this does not go to the root of the matter, and it is still unsettled whether ciphering was first devised in Asia, or may be traced further back in Europe to the arithmeticians of the school of Pythagoras. As to the main point, however, there is no doubt, that modern arithmetic comes out of ancient counting on the columns of the abacus, improved by writing a dot or a round O to show the empty column, and by this means young children now work calculations which would have been serious labour to the arithmeticians of the ancient world.

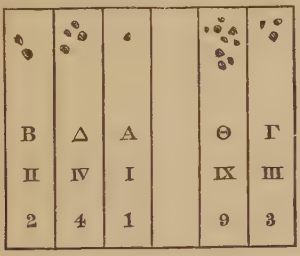

FIG. 77.—Mode of calculation by counters and by figures on Abacus.

Next as to the art of measuring. Here it may be fairly guessed that man first measured, as he first counted, on his own body. When barbarians tried by finger-breadths how much one spear was longer than another, or when in building huts they saw how to put one foot before the other to get the distance right between two stakes, they had brought mensuration to its first stage. We sometimes use this method still for rough work, as in taking a horse's height by hands, or stepping out the size of a carpet. If care is taken to choose men of average size as measurers, some approach may be made to fair measurement in this way. That it was the primitive way can hardly be doubted, for civilized nations who have more exact means still use the names of the body-measures. Besides the *cubit, hand, foot, span, nail*, already mentioned in p. 13, we have

in English the *ell* (of which the early meaning of arm or forearm is seen in *el*-bow, the arm-bend), also the *fathom* or cord stretched by the outspread arms in sailors' fashion, and the *pace* or double step (Latin *passus*) of which a thousand (*mille*) made the *mile*. But though these names keep up the recollection of early measurement by men's limbs, they are now only used as convenient names for standard measures which they happen to come tolerably near to, as for instance one may go a long way to find a man's foot a foot long by the rule. Our modern measurements are made by standard lengths, which we have inherited with more or less change from the ancients. It was a great step in civilization when nations such as the Egyptians and Babylonians made pieces of wood or metal of exact lengths to serve as standards. The Egyptian cubit-rules with their divisions may still be seen, and the King's Chamber in the Great Pyramid measures very exactly 20 cubits by 10, the cubit being 20·63 of our inches. Our foot has scarcely altered for some centuries, and is not very different from the ancient Greek and Roman feet. The French at the first Revolution made a bold attempt to cast off the old traditional standards and go straight to nature, so they established the *metre*, which was to be a ten-millionth of the distance from the pole to the equator. The calculation however proved inexact, so that the metre is now really a standard measure of the old sort, but so great is the convenience of using the same measures, that the metre and its fractions are coming more and more into use for scientific work all over the world. The use of scales and weights, and of wet and dry measures, had already begun among the civilized nations in the earliest known times. Our modern standards can even to some extent be traced back to those of the old world, as for instance the pound and ounce, gallon and pint, come from the ancient Roman weights and measures.

From measuring feet in length, men would soon come to reckoning the contents, say of an oblong floor, in square feet. But to calculate the contents of less simple figures required more difficult geometrical rules. The Greeks acknowledged the Egyptians as having invented *geometry*, that is, "land-measuring," and there may be truth in the old story that the art was invented in order to parcel out the plots of fertile mud on the banks of the Nile. There is in the British Museum an ancient Egyptian manual of mensuration (the Rhind papyrus),

one of the oldest books in the world, originally written more than 1,000 years before Euklid's time, and which shows what the Egyptians then knew and did not know about geometry. From its figures and examples it appears that they used square measure, but reckoned it roughly; for instance, to get the area of the triangular field ABC Fig. 78 (1) they multiplied half AC by AB, which would only be correct when BAC is a right angle. When

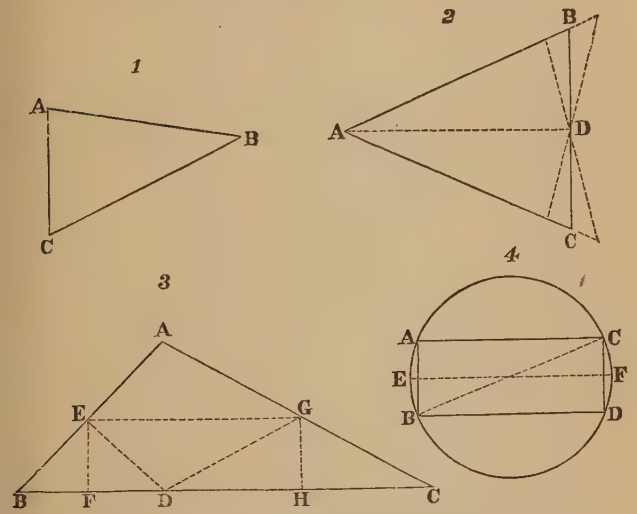

FIG. 78.—Rudimentary practical Geometry. 1, scalene triangle; 2, folded right angle; 3, folded triangle; 4, rectangle folded in circle.

the Egyptians wanted the area of a circular field, they subtracted one-ninth from the diameter and squared; thus if the diameter were 9 perches, they estimated that the circle contained 64 square perches, which the reader will find on trial is a good approximation. All this was admirable for the beginnings of geometry, and the record may well be believed that Greek philosophers such as Thales and Pythagoras, when they came to Egypt, gained wisdom from the geometer-priests of the land. But these Egyptian mathematicians, being a priestly order, had come to regard their rules as sacred, and

therefore not to be improved on, while their Greek disciples, bound by no such scientific orthodoxy, were free to go on further to more perfect methods. Greek geometry thus reached results which have come down to us in the great work of Euklid, who used the theorems known to his predecessors, adding new ones and proving the whole in a logical series. It must be clearly understood that elementary geometry was not actually invented by means of definitions, axioms, and demonstrations like Euklid's. Its beginnings really arose out of the daily practical work of land-measurers, masons, carpenters, tailors. This may be seen in the geometrical rules of the altar-builders of ancient India, which do not tell the bricklayer to draw a plan of such and such lines, but to set up poles at certain distances, and stretch cords between them. It is instructive to see that our term *straight line* still shows traces of such an early practical meaning; *line* is *linen* thread, and *straight* is the participle of the old verb to *stretch*. If we stretch a thread tight between two pegs, we see that the stretched thread must be the shortest possible; which suggests how the straight line came to be defined as the shortest distance between two points. Also, every carpenter knows the nature of a right angle, and he is accustomed to parallel lines, or such as keep the same distance from one another. To the tailor, the right angle presents itself in another way. Suppose him cutting a doubled piece of cloth to open out into the gore or wedge-shaped piece BAC in Fig. 78 (2). He must cut ADB a right angle, or his piece when he opens it will have a projection or a recess, as seen in the figure. When he has cut it right, so that BDC opens in a straight line, then he cannot but see that the sides AB, AC, and the angles ABC, ACB must exactly match, having in fact been cut out on one another. Thus he arrives, by what may be called tailor's geometry, at the result of Euklid I. 5, which now often goes by the name of the "asses' bridge." Such easy properties of figures must have been practically known very early. But it is also true that the ancients were long ignorant of some of the problems which now belong to elementary teaching. Thus it has just been mentioned how the Egyptian land-surveyors failed to make out an exact rule to measure a triangular field. Yet had it occurred to them to cut out the diagram of a triangle from a sheet of papyrus, as we may do with the triangle ABC in Fig. 78 (3), and double it up as shown in the figure, then they would

have found that it folds into the rectangle EFHG, and therefore, its area is the product of the height by half the base. It would be seen that this is no accident, but a property of all triangles, while at the same time it would appear that the three angles at A, B, C, all folding together at D, make up two right angles. Though the more ancient Egyptian geometers do not seem to have got at either of these properties of the triangle, the Greek geometers had in some way become well aware of them before Euklid's time. The old historians who tell the origin of mathematical discoveries do not always seem to have understood what they were talking of. Thus it is said of Thales that he was the first to inscribe the right-angled triangle in the circle, and thereupon sacrificed a bull. But a mathematician of such eminence could hardly have been ignorant of what any intelligent carpenter has reason to know, how an oblong board fits into a circle symmetrically; the problem of the right-angled triangle in the semicircle is involved in this, as is seen by (4) in the present figure. Perhaps the story really meant that Thales was the first to work out a strict geometrical demonstration of the problem. The tale is also told of Pythagoras, and another version is that he sacrificed a hekatomb on discovering that the square on the hypotenuse of a right-angled triangle is equal to the sum of the squares on the other two sides (Euklid I. 47). The story is not a likely one of a philosopher who forbad the sacrifice of any animal. As for the proposition, it is one which may present itself practically to masons working with square paving stones or tiles; thus, when the base is 3 tiles long, and the perpendicular 4, the hypotenuse will be 5, and the tiles which form a square on it will just be as many as together form squares on the other two sides. Whether Pythagoras got a hint from such practical rules, or whether he was led by studying arithmetical squares, at any rate he may have been the first to establish as a general law this property of the right-angled triangle, on which the whole systems of trigonometry and analytical geometry depend.

The early history of mathematics seems so far clear, that its founders were the Egyptians with their practical surveying, and the Babylonians whose skill in arithmetic is plain from the tables of square and cube numbers drawn up by them, which are still to be seen. Then the Greek philosophers, beginning as disciples of these older schools, soon left their teachers behind, and raised

mathematics to be, as its name implies, the "learning" or "discipline" of the human mind in strict and exact thought. In its first stages, mathematics chiefly consisted of arithmetic and geometry, and so had to do with known numbers and quantities. But in ancient times the Egyptians and Greeks had already begun methods of dealing with a number without as yet knowing what it was, and the Hindu mathematicians, going further in the same direction, introduced the method now called algebra. It is to be noticed that the use of letters as symbols in algebra was not reached all at once by a happy thought, but grew out of an earlier and clumsier device. It appears from a Sanskrit book that the venerable teachers began by expressing unknown quantities by the term "so-much-as," or by the names of colours, as "black," "blue," "yellow," and then the first syllables of these words came to be used for shortness. Thus if we had to express twice the square of an unknown quantity, and called it "so much squared twice," and then abbreviated this to *so sq* 2, this would be very much as the Hindus did in working out the following problem, given in Colebrooke's *Hindu Algebra*: "The square root of half the number of a swarm of bees is gone to a shrub of jasmin: and so are eight-ninths of the whole swarm: a female is buzzing to one remaining male, that is humming within a lotus, in which he is confined, having been allured to it by its fragrance at night. Say, lovely woman, the number of bees." This Hindu equation is worked out clumsily from the want of the convenient set of signs $=+-$, which were invented later in Europe, but the minus numbers are marked, and the solution is in principle an ordinary quadratic. The Arab mathematicians learnt from India this admirable method, and through them it became known in Europe in the Middle Ages. The Arabic name given to it is *al-jabr wa-l-mukabalah*, that is, "consolidation and opposition," this meaning what is now done by transposing quantities on the two sides of an equation; thence comes the present word *algebra*. It was not till about the 17th century in Europe that the higher mathematics were thoroughly established, when Descartes worked into a system the application of algebra to geometry, and Galileo's researches on the path of a ball or flung stone brought in the ideas which led up to Newton's fluxions and Leibnitz's differential calculus, with the aid of which mathematics have risen to their modern range and

power. Mathematical symbols have not lost the traces of their first beginnings as abbreviated words, as where *n* still stands for *number* and *r* for *radius*, while √, which is a running-hand *r*, does duty for root (*radix*), and ∫, which is an old-fashioned *s*, stands for the sum (*summa*) in integration.

Mechanics and Physics, worked mathematically, now form the very foundation of our knowledge of the universe. But in the old barbaric life, men had only rudimentary notions of them. The savage understands the path of a projectile well enough to aim it, and how to profit by momentum when he mounts his axe on a long rather than a short handle. But he hardly comes to bringing these practical ideas to a principle or law. Even the old civilized nations of the East, though they could lift stones with the lever, set their masonry upright with the plumb-line, and weigh gold in the balance, are not known to have come to scientific study of mechanical laws. What makes this more sure is that if they had, the Greeks would have learnt it of them, whereas it is among the Greek philosophers that the science is found just coming into existence. In Aristotle's time they were thinking about mechanical problems, though by no means always rightly; it was considered that a body is drawn toward the centre of the world, but the greater its weight the faster it will fall. The chief founder of mechanical science was Archimedes, who worked out from the steelyard the law of the lever, and deduced thence cases of all the particles of a body balancing on a common centre, now called its centre of gravity; he even gave the general theory of floating bodies, which mathematicians far on in the Middle Ages could hardly be brought to understand. Indeed, mechanical science, after the classical period, shared the general fate of knowledge during the long dead time when so much was forgotten, and what was left was in bondage to the theology of the schoolmen. It sometimes surprises a modern reader that the "wisdom of the ancients" should still now and then be set up as an authority in science. But the scholars of the Middle Ages, who on many scientific points knew less than the ancient Greeks, might well look up to them. It is curious to look at the book of Gerbert (Pope Sylvester II.), who was a leading mathematician in the tenth century, and who bungles like an early Egyptian over the measurement of the area of a triangle, though the exact method as stated by Euklid had been

well known in classical times. Physical science might almost have disappeared if it had not been that while the ancient treasure of knowledge was lost to Christendom, the Mohammedan philosophers were its guardians, and even added to its store. For this they have not always had due praise. A pretty story is told of Galileo inventing the pendulum, being led to it by watching the great hanging lamp in the cathedral of Pisa swinging steadily to and fro; but as a matter of fact, it appears that six centuries earlier Ebn Yunis and other Moorish astronomers were already using the pendulum as a time-measurer in their observations. Of all the services which Galileo did for science, perhaps the greatest was his teaching clearer ideas of force and motion. People had of old times been deceived by the evidence of their senses into the belief that the force of a moving body would gradually become exhausted and it would stop of itself, but this idea of force was changed by the new principle that force is as much required to stop a moving body as to set it in motion, and that did no opposing force retard the arrow or the wheel, the one would fly and the other roll on for ever. In that age of mathematics applied to science new discoveries followed fast. If Archimedes could have come to life again, he would have seen progress going on at last, when the pressure of the air was weighed with Torricelli's barometer, and Stevin of Bruges made out the principle of the parallelogram of forces. The notion of an attractive force had come into the minds of philosophers by observing how the magnet attracts iron at a distance, and glass and other substances when rubbed become attractive. Thus the way was open for Newton to calculate the effect of gravitation as such an attractive force, and by it to explain the movements of the heavenly bodies, thus bringing the visible world within the sway of one universal law. In the present day, among the great laws which have been established in physical science, is that of the conservation of energy, that power is not created and destroyed in the processes of nature or the machines of man, but is transformed into new manifestations equivalent to those which were before. Philosophers' minds used often to be set on the invention of a perpetual moving power, that should go on creating its own force. But nowadays this idea is so discarded that, when some projector plans an absurd machine, he is sufficiently answered by being shown that if his machine could work, the perpetual

motion would be possible. The modern mechanician has only to apply in the most desirable way the stores of force placed at his disposal by nature, and within this well-understood boundary his business flourishes more and more.

Among the forms or manifestations of energy are sound, light, heat, electricity. The classic philosophers knew in a vague way that sound spreads like waves; and the relation between the length of a harpstring and its note was laid down in arithmetical rule by Pythagoras, who measured it with the instrument we still use, the monochord. But it was the moderns who measured the velocity of sound, explained musical pitch by the rate of vibration, and made the science of tone. About light the ancients knew more. Their polished metal mirrors, flat and curved, had taught them the first principles of reflexion. Nor were they ignorant of refraction; they already knew the familiar experiment of putting a ring in a basin and pouring in water till it becomes visible. A rock-crystal lens has been dug up at Nineveh, and the Greeks and Romans were well acquainted with glass lenses. One is surprised that neither the Arab astronomers, who knew a good deal of optics, nor Roger Bacon, who in the thirteenth century gave an intelligent account of their science, ever seem to have combined two lenses into a telescope. It was not till the seventeenth century that a telescope is plainly mentioned in Holland, and Galileo, hearing of it, made the famous instrument with which he saw Jupiter's moons, and revolutionized men's ideas of the universe. The microscope and telescope may be called inverted forms of one another, and their inventions came nearly together. By these two instruments the range of man's vision has been so vastly extended beyond his unaided eyesight, that animalcules under a ten-thousandth of an inch long can now be watched through all the stages of their life, while stars whose distance from the earth is hundreds of thousands of billions of miles, are within the maps of the universe. The rainbow led to the problem of the decomposition of light and the theory of colour. The doctrine that light was as it were bright particles emitted in straight lines from the luminous body failed to explain effects such as light extinguishing light by interference, and it has yielded to the undulatory theory, of ethereal light-waves of extreme smallness and speed. In our own day the lines of the spectrum have become the means of recognis-

ing a glowing substance, so that the astronomer whose telescope reveals the faint shine of a nebula in the depths of the heavens, may test its composition with the spectroscope, as if it were a gas-jet on the laboratory table. Closely connected with the science of light is the science of heat. Not only do heat and light proceed together from the sun or fire, but the two were seen to be subject to the same laws when it was noticed that the mirror or lens which concentrated a bright spot of light, also brought to the same focus heat that would set wood on fire. The great step in the study of heat was the invention of the heat-measurer or thermometer. Who first made it is not known, but it was about three centuries ago, and its earliest form may have been the air-flask with its tube in which coloured water rises and falls, which is still the most striking way of showing a class the principle of thermometers. The doctrine of heat as due to vibration explains how heat is transformed force, so that the steam-hammer worked by the heat used in the furnace can be set to beat cold iron till it is white-hot; thus part of the force which came from heat has gone back into heat, and with the heat re-appears the other form of radiant energy, light. Lastly, the history of electricity comes from the time when the ancients wondered to see amber when rubbed pick up morsels of straw, and the loadstone draw bits of iron. The pointing of the loadstone south and north seems to have been earliest noticed by the Chinese, whence in the Middle Ages came its world-wide use in navigation. The electrical machine is only an enlarged form of the old experiment of rubbing the bit of amber. But the discoveries associated with the names of Volta and Galvani brought in a new method of generating electricity by chemical action in the battery. Franklin's kite proved the lightning-flash to be but a great electric spark. Oersted's current-wire deflecting a magnetic needle showed the relation between electricity and magnetism, and set on foot the line of invention to which the world owes the electric telegraph and much besides.

Next, as to chemistry. Its beginnings lie in practical processes such as smelting metal from the ore, fusing sand and soda into glass, and tanning leather with astringent pods or bark. The oldest civilized nations knew these and many other chemical arts, which not only were learnt by the artificers of Greece and Rome, but from time to time new processes were added to the store of

knowledge, as when we hear of their distilling mercury from cinnabar, or treating copper with vinegar to make verdigris. In early civilized ages also there arose beside these practical recipes the first dim outlines of scientific chemistry. The Greek philosophers expressed their ideas of the states of matter by the four elements, fire, air, water, earth; and they also had learnt or invented the doctrine of matter being made up of atoms—a principle now more influential than ever in modern lecture-rooms. The successors of the Greeks were the Arabic alchemists, and their disciples in mediæval Christendom. Their belief that matter might be transmuted or transformed led many of them to spend their lives among their furnaces and alembics in the attempt to turn baser metals into gold. To modern chemists, who would not be surprised to find all the many so-called elements proved to be forms of one matter, the alchemists' idea does not seem quite unreasonable in itself, and practically it led them to the pursuit of truth by experiment, so that though they found no philosophers' stone, they were repaid by discoveries such as alcohol, ammonia, sulphuric acid. Their method, being founded on trials of real fact, cleared itself more and more from the magical folly it had grown up with, and the alchemist prepared the way for the later chemist. What of all things brought on the new chemical knowledge was the explanation of what takes place in burning, rusting, and breathing. How is it that the air in a receiver is spoilt by a burning candle or a mouse within, so that it no longer allows flame or life? How is it that while some substances, like charcoal, seem to be dissipated by fire, others, like lead or iron, turn into matter heavier than before? The answers to such questions led the way to clearer notions of chemical combination, but it was long before it was understood by what fixed laws of affinity and proportion this combination takes place. The advanced student of chemistry may spend an instructive hour in looking over old chemistry books, where the catalogue of substances is a confused chaos, not as yet brought into form and order on the lines of Dalton's atomic theory.

From the chemical nature of matter we pass to the nature of living things. The more evident parts of biology or the science of life, have come under man's attentive observation from the first. So far as zoology and botany consist in noticing the forms and habits of

animals and plants, savages and barbarians are skilled in them. Such people, for instance, as the natives of the South American forests, have names for each bird and beast, whose voices, resorts, and migrations they know with an accuracy that astonishes the European naturalist whom they guide through the jungle. The catalogue of the Brazilian native names of animals and plants, often curiously descriptive of their natures, would make a small book. Thus the *jaguara pimina* or painted jaguar is distinguished from the *jaguarete* or great jaguar; the *capybara* signifies the creature "living in the grass," the *ipe-caa-goene*, or "little wayside-plant-emetic," is our *ipecacuanha*. Mankind everywhere possesses this sort of popular Natural History. So it is with anatomy. When the savage kills a deer, cuts it up, cooks the joints, heart, and liver, makes clothes and straps of the hide, cuts harpoon-heads and awls out of the long bones, and uses the sinews for thread, it stands to reason that he must have a good rough knowledge of the anatomy of an animal. The barbaric warrior and doctor have beyond such butchers' anatomy an acquaintance with the structure of man's body, as may be seen in the description of the wounds of the heroes in the Iliad, where the spear takes one in the diaphragm below the heart, and another has the shoulder-tendon broken which makes his arm drop helpless. Among the Greeks such rough knowledge passed into the scientific stage when Aristotle wrote his book on animals, and Hippokrates took medicine away from the priests and sorcerers to make it a method of treatment by diet and drugs. The action of the body came to be better understood during this classical period, as, for instance, is seen in the nerves leading to and from the brain being no longer confounded with the sinews which pull the limbs, although the same Greek word *neuron* (*nerve*) still continued to be used for both. It is curious how long it took the ancients to get at the notion of what muscle is, and how it acts. They never understood the circulation of the blood, though they had ideas about it, as in Plato's celebrated passage in the Timaios which compares the heart to a fountain sending the blood round to nourish the body, which is like a garden laid out with irrigating channels. Imperfect as ancient knowledge was, it may be plainly seen how modern science is based upon it. Thus the medical terms of Galen's system, such as the *diagnosis* of disease, are still used; and indeed many old physician's

words have passed into common talk, as when one is said to be in a *sanguine humour*, which carries us back to the time when the humours or fluids of the body were thought to cause the state of mind, the humour which is sanguine, or "of the blood," being lively and impetuous. But in knowledge of the body the moderns have left the ancients quite behind, now that the microscope shows its minute vessels and tissues, and there have been made out the circulation of the blood, the process of respiration, the chemistry of digestion, and the travelling of currents along the nerves. Natural History still goes on the principles of Aristotle, when he traces life on from lifeless matter through the series of plants and animals. Modern naturalists like Linnæus so improved the old classification, that it became possible to take a plant or animal one had never seen before and did not know the name of, and make out by examination that it must belong to such and such a genus and species. Moreover, naturalists have long been seeking to understand why the thousands of species should arrange themselves in groups or genera, the species in each genus being connected by a common likeness, and the genera themselves falling into higher groups, or orders. The thought that the likeness among the species forming a genus is a family likeness, due to these species being in fact the varied descendants of one race or stock, is the foundation of that theory of development or evolution which for many ages has been in the minds of naturalists, and now so largely prevails. This is not the place to discuss the doctrine of descent or development (see vol. i. p. 29), but it is worth while to remember that the very word *genus* meant originally birth or race, so that the naturalist who sets down the horse, ass, zebra, quagga, as all belonging to one genus Equus, is really suggesting that they are all descended from one kind of animal, and are in fact distant cousins, which is the first principle of the development-theory.

The world we live in is the subject of astronomy, geography, geology. It seems plain how the rudiments of these sciences began from the evidence of men's senses. Children living unschooled in some wild woodland would take it as a matter of course that the earth is a circular floor, more or less uneven, arched over with a dome or firmament springing from the horizon. Thus the natural and primitive notion of the world is that it is like a round dish with a cover. Rude tribes in many countries are found thinking so, and working out the idea so as to

account for such phenomena as rain, which is water from above dripping in through holes in the sky-roof. This firmament is studded with stars, and is a few miles off. There is nothing to suggest to the savage that the sun should be enormously more distant than the cloud it seems to plunge into. The sun seems to go down in the west into the sea, or through an opening in the horizon, and to rise in like manner in the east, so that sunset and sunrise force on the minds of the first rude astronomers the belief in an under-world or infernal region, through which the sun travels in the night, and which to many a nation has seemed also the abode of departed souls, when after their bright day of life they sink like the sun into the night of death. The sun and moon move as living gods in the heaven, or at least are drawn or driven by such celestial powers, while the presence of living beings in the sky seems peculiarly manifest in eclipses, when invisible monsters seize or swallow the sun and moon. All this is very natural, so natural indeed that more correct astronomy has not yet rooted it out of Europe. Not many years ago a schoolmaster who ventured to lecture on astronomy in the west of England roused the displeasure of the country folk, that this young man should tell them the world was round and went about, when they had lived on it all their lives and knew it was flat and stood still. One part of the earliest astronomy, which was so sound as to have held its own ever since, was the measurement of time by the sun, moon, and stars. The day and the month fix themselves at once. In a less exact way the seasons of the year, such as the rainy season, or the icy season, or the growing season, furnish a means of reckoning, as where a savage tells of his father's death having been three rains or three winters ago. Rude tribes, who observe the stars to find their way by, notice also that the rising and setting of particular stars or constellations mark the seasons. Thus the natives of South Australia call the constellation Lyra the Loan-bird, for they notice that when it sets with the sun, the season for getting loan-birds' eggs has begun. It stands to reason that the great facts of the year's course, the change of the sun's height at noon, and the lengthening and shortening of the days, would be noticed, so that, even among people who have not as yet measured them with any accuracy, there exists in a loose way the notion of the year. Within the year, too, the successive moons or months come to be arranged with some regularity, as

where the Ojibwas reckoned in order the wild-rice moon, the leaves-falling moon, the ice-moon, the snow-shoes moon, and so forth. But such lunar months have to be got into the year as they best may. Indeed what distinguishes the uncivilized calendar is that, though days, months, and years are known, the days are not yet fitted regularly into the months, nor is it settled how many months, much less how many days, the year is to consist of.

When we look from this to the astronomy of the ancient cultured nations, we find great progress made in observing and calculating. Yet the astronomer-priests who for ages watched and recorded the aspect of the heavens, had not yet cut themselves free from the ideas of their barbarian forefathers as to what the world as a whole was like. In the Egyptian Book of the Dead, the departed souls descend with the sun-god through the western gate, and travel with him among the fields and rivers of the under-world, and the Assyrian records also tell of the regions below, where Ishtar descends into the dark abode of fluttering ghosts, the house men enter but cannot depart from. Yet the Egyptians who held to this primitive astronomy had set the Great Pyramid by the cardinal points with remarkable exactness. In reckoning the year, they not only added to the 12 solar months of 30 days 5 intercalary days to make 365, but becoming aware that even this was not accurate, they recorded its variation till it should come round in a cycle of 1,461 years, as determined by the rising of Sirius. Even more advanced was the astronomy of the Chaldæans, with its records of eclipses extending over 2,000 years. In the astronomy of barbarians the five planets Mercury, Venus, Mars, Jupiter, and Saturn, are not thought much of in comparison with the Sun and Moon. But among the Chaldæans all the seven planets were classed together as objects of worship and observation, starting the ideas of the sacred number seven, which thence pervaded the mystical philosophy of the ancients. It may have been among the Babylonian astronomers that the study of the motions of the planets led to the theory that they were carried round on seven crystal spheres; to this day people talk of being "in the seventh heaven." The next and great step in astronomy was when the long-treasured knowledge of Babylon and Egypt was taken up by the Greeks, to be carried on by the exact methods of the geometer. The Greek astronomers were familiar with

the idea of the earth being a sphere; they calculated its circumference, and, usually taking it as the centre of the universe, they measured the apparent movements of the heavenly bodies. This system in its most perfect form, known as the Ptolemaic, held its place into the middle ages, when it came into rivalry with the Copernican system of a central sun round which revolve the earth and other planets. How this became in the hands of Kepler and Newton a mechanical theory of the universe, and how man was at last stripped of the fond conceit that his little planet was the centre of all things, need not be re-told here.

Geography is a practical kind of knowledge in which the rudest tribes are well skilled, so far as it consists in the lie of their own land, the course of the streams, the passes over the mountains, how many days' marches through forest and desert to reach some distant hunting-ground, or the hillside where hard stone for hatchets is to be found. However uncivilized a people may be, they name their mountains and rivers in such terms as "red hill" or "beaver brook." Indeed the atlas contains hundreds of names of places that once had meanings in tongues which no man any longer speaks. Scientific geography begins when men come to drawing maps, an art which perhaps no savage takes to untaught, but which was known to the early civilized nations; the oldest known map is an Egyptian plan of the gold-mines of Æthiopia. The earliest known mention of a geographer attempting a map of the world is by Herodotus, who tells of Aristagoras's bronze tablet inscribed with the circuit of the whole earth, the sea and all rivers. But to the ancients the known world was a very limited district round their own countries. It brings the growth of geography well before our minds to look at the map in Gladstone's *Juventus Mundi*, representing the world according to the Homeric poems, with its group of nations round the Mediterranean, and the great Ocean River encircling the whole. Later, in the world as known to geographers such as Strabo, the lands of men form a vast oval, reaching from the pillars of Herakles across to far India, and from tropical Africa up to polar Europe. How land and sea came to lie as they do, it is the business of geology to explain. This is among the most modern of sciences, yet its problems had long set rude men thinking. Even the Greenlanders and the South Sea Islanders have noticed the fossils inland and

high on the mountains, and account for them by declaring that the earth was once tilted over, or that the sea rose in a great flood and covered the mountains, leaving at their very tops the remains of fishes. In the infancy of Greek science, Herodotus speculated more rightly as to how the valley of Egypt had been formed by deposits of mud from the Nile, while the shells on the mountains proved to him that the sea had once been where dry land now is. But two thousand years had to pass before these lines of thought were followed up by the modern geologists, to whom the earth is now revealing the long history of the deposit and removal, rising and sinking of its beds, and the succession of plants and animals which from remote ages have lived upon it.

From this survey of the various branches of science, it is clear that their progress has been made in age after age by facts being more fully observed and more carefully reasoned on. Reasoning or logic is itself a science, but like other sciences, it began as an art which man practised without stopping to ask himself why or how. He worked out his conclusions by thinking and talking, untold ages before it occurred to him to lay down rules how to argue. Indeed, speech and reason work together. A language which distinguishes substantive, adjective, and verb, is already a powerful reasoning-apparatus. Men had made no mean advance toward scientific method when their language enabled them to class wood as heavy or light, and to form such propositions as, light wood floats, heavy wood sinks. The rise of reasoning into the scientific stage was chiefly due to the Greek philosophers, and Aristotle brought argument into a regular system by the method of syllogisms. Of course the simpler forms of these had always belonged to practical reasoning, and a savage, aware that red-hot coals burn flesh, would not thank a logician for explaining to him that in consequence of this principle a particular red-hot coal will burn his fingers. It must not be supposed that the introduction of logic as a science had the effect of at once stopping bad argument, and it was rather by setting practically to work on exact reasoning, especially in mathematics, that the Greeks brought on a general advance in knowledge. The importance of science was recognized when the famous Museum of Alexandria flourished, the type of later universities, with its great libraries, its laboratories, its zoological and botanical gardens. Hither students came by thousands

to follow mathematics, chemistry, anatomy, under professors who resorted there at once to teach others and to learn themselves. Looking at the history of science for eighteen hundred years after this flourishing time, though some progress was made, it was not what might have been expected, and on the whole things went wrong. The so-called scholastic period which prevailed in Europe was unfavourable, partly because excessive reverence for the authority of the past fettered men's minds, and partly because the learned successors of Aristotle had come to believe so utterly in argumentation as to fancy that the problems of the world could be dealt with by arguing about them, without increasing the stock of real knowledge. The great movement of modern philosophy, with which the name of Bacon is associated as a chief expounder, brought men back to the sound old method of working experience and thought together, only now the experience was more carefully sought and observed, and thought arranged it more systematically. We who live in an age when every week shows new riches of nature's facts, and new shapeliness in the laws that connect them, have the best of practical proof that science is now moving on a right track.

The student who wishes to compare the mental habits of rude and ancient peoples with our own, may look into a subject which has now fallen into contempt from its practical uselessness, but which is most instructive in showing how the unscientific mind works. This is Magic. In the earlier days of knowledge men relied far more than we moderns do on reasoning by analogy or mere association of ideas. In getting on from what is known already to something new, analogy or reasoning by resemblance always was, as it still is, the mind's natural guide in the quest of truth. Only its results must be put under the control of experience. When the Australians picked up the bits of broken bottles left by the European sailors, the likeness of the new material to their own stone flakes at once led them to try it for teeth to their spears; experience proved that in this case the argument from analogy held good, for the broken glass answered perfectly. So the North American Indian, in default of tobacco, finds some more or less similar plant to serve instead, such as willow-bark. The practical knowledge of nature possessed by savages is so great that it cannot have been gained by mere chance observations; they must have been for ages constantly

noticing and trying new things, to see how far their behaviour corresponded with that of things partly like them. And where the matter can be brought to practical trial by experiment, this is a thoroughly scientific method. But the rude man wants to learn and do far more difficult things—how to find where there is plenty of game, or whether his enemies are coming, how to save himself from the lightning, or how to hurt some one he hates, but cannot safely throw a spear at. In such matters beyond his limited knowledge, he contents himself with working on resemblances or analogies of thought, which thus become the foundation of magic. On looking into the "occult sciences," it is easy to make out in them principles which are intelligible if one can only bring one's mind down to the childish state they belong to. Nothing shows this better than the rules of astrology, although this is far from the rudest kind of magic. According to the astrologers, a man born under the sign Taurus is likely to have a broad brow and thick lips, and to be brutal and unfeeling, but, when enraged, violent and furious. If he had been born under the sign Libra, he would have had a just and well-balanced mind. All this is because two particular groups of stars happen to have been called the bull and the balance; the child whose hour of birth has some sort of astronomical relation to these constellations is imagined to have a character resembling that of a real bull or a real pair of scales. So with the planets. He over whom Mars presides in his better aspect will be bold and fearless, but where the planet is "ill-dignified," then he will be a boastful shameless bully, ready to rob and murder. Had he but been born when Venus was in the ascendant, how different would he have been, with dimpled cheek and soft voice apt to speak of love. Practically foolish as all this is, it is not unintelligible. There is in it a train of thought which can be followed quite easily, though it is a train of thought hardly strong enough for a joke, much less for a serious argument. Yet such is the magic which still pervades the barbaric world. The North American Indian, eager to kill a bear to-morrow, will hang up a rude grass image of one and shoot it, reckoning that this symbolic act will make the real one happen. The Australians at a burial, to know in what direction they may find the wicked sorcerer who has killed their friend, will take as their omen the direction of the flames of the grave-fire. The Zulu who has to buy cattle may

be seen chewing a bit of wood, in order to soften the hard heart of the seller he is dealing with. The accounts of such practices would fill a volume, and they do not seem broken-down remains of old ideas, for there is no reason to suppose they ever had more sense in them than is to be plainly seen now. They may be derived from some such loose savage logic as this :—Things which are like one another behave in the same way—shooting this image of a bear is like shooting a real bear—therefore, if I shoot the image I shall shoot a real bear. It is true that such magical proceedings, if tested by facts, prove to be worthless. But if we wonder that nevertheless they should so prevail among mankind, it may be answered that they last on even in our own country among those who are too ignorant to test them by facts—the rustics who believe a neighbour's ill-wishing has killed their cow, and who, on true savage principles, try to punish the evil-doer by putting a heart spitefully stuck full of pins up the chimney to shrivel in the smoke, that in like manner sharp pangs may pierce him and he may waste away.

In another and very different way the student of science is interested in magic. Loose and illogical as man's early reasonings may be, and slow as he may be to improve them under the check of experience, it is a law of human progress that thought tends to work itself clear. Thus even the fancies of magic have been sources of real knowledge. Few magical superstitions are more troublesome than the Chinese geomancy or rules of "wind and water," by which a lucky site has to be chosen for building a house. Absurd as this ancient art is, its professors appear to have been the earliest to use the magnetic compass to determine the aspects of the heavens, so that it seems the magician gave the navigator his guide in exploring the world. What exact science owes to astrology is well known, how in Chaldæa the places of the stars were systematically observed and recorded for portents of battle and pestilence, and registers of lucky and unlucky days. The old magical character hung to astronomy even into modern ages, when astrologers like Tycho Brahe and Kepler, who believed that the destinies of men were foretold by the planets, helped by their observation and calculation to foretell the motions of the planets themselves. Thus man has but to go on observing and thinking, secure that in time his errors will fall away, while the truth he attains to will abide and grow.

CHAPTER XIV

THE SPIRIT-WORLD

Religion of Lower Races, 87—Souls, 87—Burial, 91—Future Life, 92—Transmigration, 93—Divine Ancestors, 93—Demons, 95—Nature Spirits, 98—Gods, 99—Worship, 104—Moral Influence, 106.

It does not belong to the plan of this book to give a general account of the many faiths of mankind. The anthropologist, who has to look at the religions of nations as a main part of their life, may best become acquainted with their general principles by beginning with the simple notions of the lower races as to the spirit-world. That is, he has to examine how and why they believe in the soul and its existence after death, the spirits who do good and evil in the world, and the greater gods who pervade, actuate, and rule the universe. Anyone who learns from savages and barbarians what their belief in spiritual beings means to them, will come into view of that stage of culture where the religion of rude tribes is at the same time their philosophy, containing such explanation of themselves and the world they live in as their uneducated minds are able to receive.

The idea of the soul which is held by uncultured races, and is the foundation of their religion, is not difficult to us to understand, if we can fancy ourselves in their place, ignorant of the very rudiments of science, and trying to get at the meaning of life by what the senses seem to tell. The great question that forces itself on their minds is one that we with all our knowledge cannot half answer, what the life is which is sometimes in us, but not always. A person who a few minutes ago was walking and talking, with all his senses active, goes off motionless and unconscious in a deep sleep, to wake after a while with renewed vigour. In other conditions the life ceases more entirely, when one is stunned or falls into a swoon or trance, where the beating of the heart and breathing seem to stop, and the body, lying deadly pale and insensible, cannot be awakened; this may last for minutes or hours, or even

days, and yet after all the patient revives. Barbarians are apt to say that such a one died for a while, but his soul came back again. They have great difficulty in distinguishing real death from such trances. They will talk to a corpse, try to rouse it and even feed it, and only when it becomes noisome and must be got rid of from among the living, they are at last certain that the life has gone never to return. What, then, is this soul or life which thus goes and comes in sleep, trance, and death? To the rude philosopher, the question seems to be answered by the very evidence of his senses. When the sleeper awakens from a dream, he believes he has really somehow been away, or that other people have come to him. As it is well known by experience that men's bodies do not go on these excursions, the natural explanation is that every man's living self or soul is his phantom or image, which can go out of his body and see and be seen itself in dreams. Even waking men in broad daylight sometimes see these human phantoms, in what are called visions or hallucinations. They are further led to believe that the soul does not die with the body, but lives on after quitting it, for although a man may be dead and buried, his phantom-figure continues to appear to the survivors in dreams and visions. That men have such unsubstantial images belonging to them is familiar in other ways to the savage philosopher, who has watched their reflexions in still water, or their shadows following them about, fading out of sight to reappear presently somewhere else, while sometimes for a moment he has seen their living breath as a faint cloud, vanishing though one can feel that it is still there. Here then in few words is the savage and barbaric theory of souls, where life, mind, breath, shadow, reflexion, dream, vision, come together and account for one another in some such vague confused way as satisfies the untaught reasoner. The Zulu will say that at death a man's shadow departs from his body and becomes an ancestral ghost, and the widow will relate how her husband has come in her sleep and threatened to kill her for not taking care of his children; or the son will describe how his father's ghost stood before him in a dream, and the souls of the two, the living and the dead, went off together to visit some far-off kraal of their people. The Malays do not like to wake a sleeper, lest they should hurt him by disturbing his body while his soul is out. The Ojibwas describe how one of their chiefs died, but while they were watching the body, on the

third night his shadow came back into it, and he sat up and told them how he had travelled to the River of Death, but was stopped there and sent back to his people. The Nicaraguans, when questioned by the Spaniards as to their religion, said that, when a man or woman dies, there comes out of their mouth something that resembles a person and does not die, but the body remains here—it is not precisely the heart that goes above, but the breath that comes from their mouth and is called the life. The lower races sometimes avoid such confusion of thoughts as this, by treating the breath, the dream-ghost, and other appearances, as being separate souls. Thus, some Greenlanders reckoned man as having two souls, his shadow and his breath; and the Fijians said that the "dark spirit" or shadow goes down to the world below, but the "light spirit" or reflexion seen in water stays near where he dies. The reader may call to mind examples how such notions of the soul lasted on hardly changed in the classic world; how in the Iliad the dead Patroklos comes to the sleeping Achilles, who tries in vain to grasp him with loving hands, but the soul like smoke flits away below the earth; or how Hermotimos, the seer, used to go out from his body, till at last his soul, coming back from a spirit-journey, found that his wife had burnt his corpse on the funeral pile, and that he had become a bodiless ghost. At this stage the idea of the soul was taken up by the Greek philosophers and refined into more metaphysical forms; the life and mind were separated by dividing the soul into two, the animal and the rational soul, and the conception of the soul as of thin ethereal substance gave place to the definition of the immaterial soul, which is mind without matter. To follow the discussion of these transcendental problems in ancient and modern philosophy will occupy the student of metaphysics, but the best proof how the earlier and grosser soul-theory satisfied the uncultured mind is that to this day it remains substantially the belief of the majority of the human race. Even among the most civilized nations language still plainly shows its traces, as when we speak of a person being in an *ecstasy* or "out of himself" and "coming back to himself," or when the souls of the dead are called *shades* (that is, "shadows") or *spirits* or *ghosts* (that is, "breaths"), terms which are relics of men's earliest theories of life.

It may have occurred to some readers that the savage philosopher ought, on precisely the same grounds, to

believe his horse or dog to have a soul, a phantom-likeness of its body. This is in fact what the lower races always have thought and think still, and they follow the reasoning out in a way that surprises the modern mind, though it is quite consistent from the barbarian's point of view. If a human soul seen in a dream is a real object, then the spear and shield it carries and the mantle over its shoulders are real objects too, and all lifeless things must have their thin flitting shadow-souls. Such are the souls of canoes and weapons and earthen pots that the Fijians fancy they see swimming down the stream pellmell into the life to come, and the ghostly funeral gifts with which the Ojibwas imagine the souls of the dead laden on their journey to the spirit-land—the men carrying their shadowy guns and pipes, the women their baskets and paddles, the little boys their toy bows and arrows. The funeral sacrifices, which in one shape or other are remembered or carried on still in every part of the globe, give us the clearest idea how barbaric religion takes in together the souls of men, animals, and things. In Peru, where a dead prince's wives would hang themselves in order to continue in his service, and many of his attendants would be buried for him to take their souls with him, people declared that they had seen those who had long been dead walking about with their sacrificed wives, and adorned with the things that were put in the grave for them. So only a few years since in Madagascar it was said that the ghost of King Radama had been seen dressed in a uniform buried with him, and mounted on one of the horses that were killed at his tomb. With such modern instances before us, we understand the ancient funeral rites of which the traces remain in the burial-mounds on our own hills, with their skeletons of attendants lying round the chief, and the bronze weapons and golden arm-rings. Classic literature abounds in passages which show how truly the modern barbarian represents the ancient; such are the burning of Patroklos with the Trojan captives and the horses and hounds, the account of the Scythian funerals by Herodotus, and his story of Melissa's ghost coming back shivering because the clothes had not been burnt for her at her burial. There are " native " districts in India where the *suttee* or " goodwife " is still burnt on her husband's funeral pile. In Europe, long after the wives and slaves ceased thus to follow their master, the warrior's horse was still solemnly killed at his grave and buried with him. There is a description of this barbaric

rite being performed as lately as 1781 at Treves, at the funeral of Friedrich Kasimir, Count Boos von Waldeck, a Knight of the Teutonic Order. In England the pathetic ceremony of leading the horse in the soldier's funeral is the last remnant of the ancient sacrifice. Other quaint relics of the old funeral customs are to be met with. There are German villages where the peasants put shoes on the feet of the corpse (the "hell-shoon" with which the old Northmen were provided for the dread journey to the next world), and elsewhere a needle and thread is put in for them to mend their torn clothes, and the dead has a piece of money put in his hand or mouth (like the obol of Charon) to pay his way with, or for the ferry across the river of death.

Mention has just been made of ancient burial-mounds. Seeing how barbarians reverence and fear the souls of the dead, we may understand the care they take of their bodies, leaving the hut as a dwelling for the dead, or drying the corpse and setting it up on a scaffold, or burying it in a canoe or coffin, or buiding up a strong tomb over it, or for the ashes, if the people have taken to cremation. Prehistoric burial-places in our own country are still wonders to us for the labour they must have cost their barbaric builders. Most conspicuous are the great burial-mounds of earth or cairns of stones. Some of the largest of these appear to date from the stone-age. But their use lasted on through the bronze-age into the iron-age; and to this day in the Highlands of Scotland the memory of the old custom is so strong that the mourners, as they may not build a cairn over the grave in the churchyard, will sometimes set up a little one where the funeral procession stops on the way. Within the old burial-mounds or barrows, there may be a cist or rude chest of stone slabs for the interment, or a chamber of rude stones, sometimes with galleries. Many such stone structures are to be seen above ground, especially the *dolmens*, *i.e.* stone tables, formed of three or four great upright stones, with a top-stone resting on them, such as Kit's Coty House, not far from Rochester. The remains dug up show that the dolmens were tombs. Another kind of early stone monuments are the *menhirs*, *i.e.* long stones set up singly. It happens that the Khasias of north-east India have gone on to modern times setting up such rude pillars as memorials of the dead, so that it may be reasonably guessed that those in Brittany, for instance, had the same purpose. Another kind of rude stone structures

well known in Europe are the *cromlechs*, or stone circles, formed of upright stones in a ring, such as Stanton Drew, not far from Bristol. There is proof that the stone circles have often to do with burials, for they may surround a burial-mound, or have a dolmen in the middle. But considering how tombs are apt to become temples where the ghost of the buried chief or prophet is worshipped, it is likely that such stone circles should also serve as temples, as in the case of South India at the present time, where cocks are actually sacrificed to the village deity, who is represented by the large stone in the centre of a cromlech. Rude stone monuments may be traced in a remarkable line on the map, from India across to North Africa, and up to the west side of Europe (*see* Fergusson's map). The purpose of them all is not fully understood, especially the lines of great stones at Carnac and Abury, and Stonehenge with its great hewn upright and cross stones. But, as has been here shown, there are facts which go far to explain the meaning of dolmens, menhirs, and cromlechs. The fanciful speculations of the old-fashioned antiquaries, such as that the dolmens were "Druid's altars," are giving place to sober examination such as the reader may find in Lubbock's *Prehistoric Times*.

In the barbaric religion, which has left such clear traces in our midst, what is supposed to become of the soul after death? The answers are many, but they agree in this, that the ghosts must be somewhere whence they can come to visit the living, especially at night time. Some tribes say that the soul continues to haunt the hut where it died, which is accordingly deserted for it; or it hovers near the burial-ground, which is sometimes the place of village resort, so that the souls of ancestors can look on kindly, like the old people sitting round the village green watching the youngsters at their sports; or the ghosts flit away to some region of the dead in the deep forests or on mountain-tops or far-away islands over the sea, or up on the plains above the sky, or down in the depths below the ground where the sun descends at night. Such people as the Zulus can show the holes where one can descend by a cavern into the under-world of the dead, an idea well known in the classic lake Avernus, and which has lasted on to our own day in St. Patrick's Purgatory in Lough Dearg. By a train of fancy easy to follow, it is often held that the home of the dead has to do with that far-west region where the sun dies at night. Islanders like

the Maoris imagine the souls speeding away from the westernmost cape of New Zealand, just as on the coast of Brittany, where Cape Raz stands out westward into the ocean, there is the "bay of souls," the launching-place where the departed spirits sail off across the sea. Many rude tribes think the spirit-world to be the pleasant land they see in dreams, where the dead live in their spirit-villages, and there is game and fish in plenty, and the sun always shines; but others fancy it the dim land of shadows, the cavernous under-world of night. Both ideas are familiar to us in poetry—one in the earthly paradise of the legends, the other in such passages as describe Odysseus' visit to the bloodless ghosts in the dreary dusk of Hades, or the shadows of the dead in Purgatory wondering to see Dante there, whose fleshly body, unlike their own phantom forms, stops the sunlight and casts a shadow.

Hitherto we have been speaking of the bodiless souls or ghosts of the dead, but it also agrees with their nature that they may enter into new bodies and live again on earth. In fact one of the most usual beliefs of the lower races is that the souls of dead ancestors are re-born in children, an idea which explains the fact of children having a likeness to the father's or mother's family. For instance, the Yoruba negroes greet a new-born child with the salute, "Thou art come!" and then set themselves to decide what ancestral soul has returned. It does not, however, follow that the body in which the soul takes up its new abode should be human: it may enter into a bear or jackal, or fly away in a bird, or, as the Zulus think, it may pass into one of those harmless snakes which creep about in the huts, liking the warmth of the family hearth, as they did while they were old people, and still kindly taking the food given by their grandchildren. In such simple forms there appears among the lower races the notion of transmigration which in Brahmanism and Buddhism becomes a great religious doctrine.

To return to the souls of the dead which flit to and fro as ghosts. These, wherever they dwell, are naturally believed to keep up their interest in the living, and their families hold kindly intercourse with them. Thus, in North America a Mandan woman will talk by the hour to her dead husband or child; and a Chinese is bound to announce any family event, such as a wedding, to the spirits of his ancestors, present in their memorial tablets. The ghosts of dead kinsfolk are not only talked to but fed; the family offer them morsels of food at their own meals,

and hold once a year a feast of the dead, when the souls of ancestors for generations back are fancied present and invisibly partaking of the food. Such offerings to the dead not only go on through the savage and barbaric world, but last on into higher civilization, their traces still remaining in Europe. The Russian peasant, who fancies the souls of his forefathers creeping in and out behind the saints' pictures on the little icon-shelf, puts crumbs of cake there for them. One has only to cross the Channel to see how the ancient feast of the dead still keeps its primitive character in the festival of All Souls, which is its modern representative; even at the cemetery of Père-Lachaise they still put cakes and sweetmeats on the graves, and in Brittany the peasants that night do not forget to make up the fire and leave the fragments of the supper on the table, for the souls of the dead of the family who will come to visit their home. All this belongs to the ancestor-worship or religion of the divine dead, which from remote antiquity has been, as it is even now, the main faith of the larger half of mankind. But this worship does not come only from family affection, for the ghosts of the dead are looked upon as divine beings, powerful both for good and harm. The North American Indian, who prays to the spirits of his forefathers to give him good weather or luck in hunting, if he happens to fall into the fire will believe he has neglected to make some offering to the spirits, and they have pushed him in to punish him. In Guinea the negroes who regularly bring food and drink to the images of their dead relatives look to them for help in the trials of life, and in times of peril or distress crowds of men and women may be seen on the hill-tops or the skirts of the forest, calling in the most piteous and touching tones on the spirits of their ancestors. Such accounts help us to understand what real meaning there is in the ancestor-worship which to a Chinese or Hindu is the first business of life, and how the pious rites for the dead ancestors or lares formed the very bond which held a Roman family together. Our modern minds have rather lost the sense of this, and people often think the apotheosis of a dead Roman emperor to have been a mere act of insane pride, whereas in fact it was an idea understood by any barbarian, that at death the great chief should pass into as great a deity.

That barbarians should imagine the manes or ghosts of their dead to be such active powerful beings, arises naturally from their notions of the soul; but this requires

a word of explanation. As during life the soul exercises power over the body, so after death when become a ghost it is believed to keep its activity and power. Such ghosts interfering in the affairs of the living are usually called good and evil spirits, or demons. There is no clear distinction made between ghosts and demons; in fact, savages generally consider the demons who help or plague them to be souls of dead men. Good or evil, the man keeps after death the temper he had in mortal life. Not long ago, in South India, where the natives are demon-worshippers, it was found that they had lately built a shrine of which the deity was the ghost of a British officer, a mighty hunter, whose votaries, mindful of his tastes in life, were laying on his altar offerings of cheroots and brandy. The same man will be a good spirit to his friends and an evil spirit to his enemies, and even to his own people he may be sometimes kind and sometimes cruel, as when the Zulus believe that the shades of dead warriors of their tribe are among them in battle and lead them to victory; but if these ghostly allies are angry and turn their backs, the fight will go against them. When people like the American Indians or the African negroes believe that the air around them is swarming with invisible spirits, this is not nonsense. They mean that life is full of accidents which do not happen of themselves; and when in their rude philosophy they say the spirits make them happen, this is finding the most distinct causes which their minds can understand. This is most plainly seen in what uncivilised men believe about disease. We have noticed already that they account for fainting or trance by supposing the soul to leave the body for a time, and here it may be added that weakness or failure of health is in the same way thought to be caused by the soul or part of it going out. In these cases, to bring the soul back is the ordinary method of cure, as where the North American medicine-man will pretend to catch his patient's truant soul and put it back into his head, or in Fiji a sick native has been seen lying on his back, bawling to his own soul to come back to him. But in other conditions of disease the patient's behaviour seems rather that of a man who has got a soul in him that is not his proper soul. In any painful illness, especially when the sick man is tossing and shaking in fever, or writhing in convulsions on the ground, or when in delirium or delusion he no longer thinks his own thoughts or speaks

with his own voice, but with distorted features and strange, unearthly tones breaks into wild raving, then the explanation which naturally suggests itself is that another spirit has entered into or possessed him. Any one who watches the symptoms of a hysterical-epileptic patient, or a maniac, will see how naturally in the infancy of medical science demoniacal possession came to be the accepted theory of disease, and the exorcism or expulsion of these demons the ordinary method of treatment. It is so among savages, as when a sick Australian will believe that the angry ghost of a dead man has got into him and is gnawing his liver; or when in a Patagonian skin hut the wizards may be seen dancing, shouting, and drumming to drive out the evil demon from a man down with fever. Such ideas were at home in ancient history, as in the well-known Egyptian tablet referring to the time of Rameses XII. (12th century B.C.) to be seen in the Paris Library, and translated in *Records of the Past*, where the Egyptian god Khons was sent in his ark to cure the little princess Bentaresh of the evil movement in her limbs. When he came, the demon said, "Great god who chasest demons, I am thy slave, I will go to the place whence I came." Then they made a sacrifice for that spirit, and he went in peace, leaving the patient cured. As far back as the history of medicine reaches, we find the contest between this old spirit-theory of disease and the newer ideas of the physicians, with their diet and drugs; and though the doctors have now taken the upper hand, yet in any nation short of the most civilized the earlier notions may still be found unchanged. When Prof. Bastian, the anthropologist, was travelling in Burma, his cook had an apoplectic fit, and the wife was doing her best to appease the offended demon who had brought it on, by putting little heaps of coloured rice for him, and prayers, "Oh, ride him not! Ah, let him go! Grip him not so hard! Thou shalt have rice! Ah, how good that tastes!" In countries where this theory of disease prevails, the patients' own delusions work in with and confirm it in most striking ways. As fully persuaded as the bystanders of the reality of their demons, they will recognise them in the figures they dream of or see in their delirium, and, what is more, under delusion or diseased imagination they so lose their sense of being themselves, as to talk with what they believe to be the voice of the demon within them, answering in its name, just as the sick princess does in Syria three thousand years ago.

Englishmen in India and the Far East often have the opportunity of being present at these strange old-world scenes, and hearing the demon-voice whisper, or squeak, or roar, out of the patient's mouth, that he is the spirit so-and-so, and tell what he is come for; at last, when satisfied with what he wants, or subdued by the exorcist's charms and threats, the demon consents to go, and then the patient leaves off his frantic screams and raving, his convulsive writhing quiets down, and he sinks into an exhausted sleep, often relieved for a time when the malady is one where mental treatment is effective. Nor is it necessary to go to India or China for illustrations of this early theory of disease. In Spain the priests still go on exorcising devils out of the mouths and feet of epileptic patients, though this will probably cease in a few years, when it is known how successfully that hitherto intractable disease may be treated with potassium bromide.

In other ways the notion of spirits serves to account for whatever happens. That certain unusually fierce wolves or tigers are "man-eaters" is explained by the belief that the souls of wicked men go out at night and enter into wild-beast bodies to prey on their fellow-men; these are the man-tigers and were-wolves—that is, "man-wolves"—which still live in the popular superstition of India and Russia. Again, we all know that many living people grow pale and bloodless and pine away; in Slavonic countries this is thought to be caused by blood-sucking nightmares, whose dreadful visits the patient is conscious of in his sleep, and these creatures are ingeniously accounted for as demon-souls dwelling in corpses, whose blood accordingly keeps fluid long after death; they call them vampires. It has been suggested that primitive men gained from their ideas of souls and spirits their first clear notions of a cause of anything, and this is at any rate so far true that rude tribes do find in the doings of spirits around them a reason for every stumble over a stone, every odd sound or feeling, every time they lose their way in the woods. Thus, in the scores of good and evil chances which meet the barbarian from hour to hour, he finds work for many friendly or unfriendly spirits. Especially his own luck or fortune takes shape in a guardian spirit who belongs to him and goes about with him. This may be, as the rude Tasmanians have thought, a dead father's soul looking after his son, or such a patron-spirit as the North American warrior fasts for till he sees

it in a dream; or it may be, like the *genius* of the ancient Roman, a spirit born with him for a companion and guardian through life. The genius of Augustus was a divine being to be prayed and sacrificed to, but how we moderns have left behind the thoughts of the ancients, while still using their words, is curiously seen in the changed meaning with which we now talk of the genius of Handel or Turner. Not less striking is the change which has come in our thoughts about the world around us, the sky and the sea, the mountains and the forests. We have learnt to watch the operation of physical laws of gravity and heat, of growth and decomposition, and it is only with an effort that we can get our imagination back to the remote days when men looked to an infinite multitude of spiritual beings as the causes of nature. Yet this belief arises plainly from the theory of the soul, for these spirits are looked upon as souls working nature much as human souls work human bodies. It is they who cast up the fire in the volcano, tear up the forest in the hurricane, spin the canoe round in the whirlpool, inhabit the trees and make them grow. The lower races not only talk of such nature-spirits, but deal with them in a thoroughly personal way which shows how they are modelled on human souls. Modern travellers have seen North Americans paddling their canoes past a dangerous place on the river and throwing in a bit of tobacco with a prayer to the river-spirit to let them pass. An African woodcutter who has made the first cut at a great tree has been known to take the precaution of pouring some palm-oil on the ground, that the angry tree-spirit coming out may stop to lick it up, while the man runs for his life. The state of mind to which these nature-spirits belong must have been almost as clearly remembered by the Greeks, when they could still fancy the nymphs of the lovely groves, and springs, and grassy meadows, coming up to the council of the Olympian gods and sitting around on the polished seats, or the dryads growing with the leafy pines and oaks, and uttering screams of pain when the woodman's axe strikes the trunk. The Anglo-Saxon dictionary preserves the curious word *woodmare* for an echo (*wudu-mær* = wood-nymph), a record of the time when Englishmen believed, as barbarians do still, that the echo is the voice of an answering spirit; the word *mare*, for spirit or demon, appears also in *nightmare*, the throttling dream-demon who was as real to our forefathers as he is to the natives of Australia now. Super-

seded by physical science, the old nature-spirits still find a home in poetry and folk-lore; the Loreley is only a modernized version of the river-demon who drowns the swimmer in the whirlpool; the healing water-spirits of the old sacred wells have only taken saints' names, the little elves and fairies of the woods are only dim recollections of the old forest-spirits. It may surprise the readers of Huxley's *Physiography* to recognise in fairy-tales the nature-spirits in whose personal shape prehistoric man imagined the forces of nature.

Above the commonalty of souls, demons, and nature-spirits, the religions of all tribes recognise higher spirits, or gods. Where ancestor-worship prevails, the souls of great chiefs and warriors or any celebrated persons may take this divine rank. Thus, the Mongols worship as good deities the great Genghis Khan and his princely family. The Chinese declare that Pang, who is worshipped by carpenters and builders as their patron divinity, was a famous artificer who lived long ago in the province of Shangtung, while Kwang-tae, the War-god, was a distinguished soldier who lived under the Han dynasty. The idea of the divine ancestor may even be carried far enough to reach supreme deity, as where the Zulus, working back from ghostly ancestor to ancestor, talk of Unkulunkulu, the Old-Old-one, as the creator of the world; or the Brazilian tribes say that Tamoi the Grandfather, the first man, dwelt among them and taught them to till the soil, at last rising to the sky, where he will receive their souls after death. Among the nature-spirits also the barbarian plainly perceives great gods who rule the universe. The highest deity of the African negroes is the Sky, who gives the rain and makes the grass grow, and when they wake in the morning they thank him for opening the door to let the sun in. Thus they are at the same stage of thought as our Aryan ancestors, whose great deity *Dyaus*, sung of in the hymns of the Veda, was at once the solid personal Sky that rains and thunders, and the Heaven-god who animates it. This deity remains even in name in the Greek *Zeus*, and Latin *Jupiter*, the Heaven-father, both religions keeping up its double sense of sky and sky-god, belonging to the barbaric theology which could see massive life in the over-arching firmament, and could explain that life by an indwelling deity, modelled on the human soul. We may best understand what was meant by the Heaven-god, if we think of him as the soul of the sky. Among all the

relics of barbaric religion which surround us, few are more striking than the phrases which still recognise as a deity the living sky, as "Heaven forgive me!" "The vengeance of Heaven will overtake him." The rain and thunder are mostly taken as acts of the Heaven-god, as where Zeus hurls the thunderbolt and sends the showers. But some peoples have a special Rain-god, like the Khonds of Orissa, who pray to Pidzu Pennu that he will pour down the waters through his sieve upon their fields. Others have a special Thunder-god, like the Yorubas, who say it is Shango who casts down with the lightning-flash and the thunder-clap his thunder-axes, which are the stone celts they dig up in the ground; we English keep up the memory of the god Thunder or Thor in our word *Thursday*, which is a translation of *Dies Jovis*. In barbaric theology, Earth, the mother of all things, takes her place, as when the pious Ojibwa Indian digging up his medicine-plants is careful to leave an offering for great-grandmother Earth. No fancy of nature can be plainer than that the Heaven-father and the Earth-mother are the universal parents, nor could any ceremony acknowledge them more naturally than the Chinese marriage when bride and bridegroom prostrate themselves before Heaven and Earth. The Earth-goddess is clear in classic religion, Dēmētēr, Terra Mater, and perhaps the last trace of her worship among ourselves may be the leaving of the last handful of corn-ears standing in the field or the carrying it in triumph in the harvest-home. In modern times it is among the negroes of the Guinea coast that the clearest idea of the Sea-god is to be found, when the native kings, praying him not to be boisterous, would have rice and cloth and bottles of rum, and even slaves, cast into the sea as sacrifices. So a Greek or Roman general, before embarking on the dangerous waves, would sacrifice a bull to Poseidōn or Neptune. To men who could thus look on the sky, earth, and sea as animated, intelligent beings, the Sun, giver of light and life to the world, rising and crossing the sky and descending at night into the under-world whence he arose, has the clearest divine personality. There is a quaint simplicity in the account which not many years ago a Samoyed woman gave of her daily prayers; at sunrise, bowing to the sun, she said, "When thou, God, risest, I too rise from my bed!" and in the evening, "When thou, God, goest down, I too get me to rest." As far back as ancient history reaches, the Sun-god appears, as where, in

the pictures on Egyptian mummy-cases, Ra, the Sun, is seen travelling in his boat through the upper and lower regions of the universe. Every morning those modern ancients, the Brahmans, may be seen standing on one foot with their hands held out before them and their faces turned to the east, adoring the Sun: among the oldest prayers which have come down unchanged from the old Aryan world is that which they daily repeat, "Let us meditate on the desirable light of the divine Sun; may he rouse our minds!" The Moon-god or goddess marks the festivals of rude forest tribes who dance by the light of the full moon. It is not uncommon for the Moon to rank above the Sun, as perhaps for astronomical reasons was the case in ancient Babylonia; but more usually the Sun stands first, as seems to us more natural; and commonly Sun and Moon are looked on as a pair, brother and sister, or husband and wife. It is easy to understand why at the famous temple in Syria, Sun and Moon had no images like the other gods, because they themselves were to be seen by all men. No doubt this is why of all the old nature-gods they alone still have personal obeisance done to them among us to this day; in Germany or France one may still see the peasant take off his hat to the rising sun, and in England the new moon is saluted with a bow or curtsey, as well as the curious practice of "turning one's silver," which seems a relic of the offering of the moon's proper metal. Fire, though hardly a deity of the first order, is looked upon as a personal being, and worshipped both for the good and harm it does to man, and as minister of the greater gods. Among the Aryan nations, the first word of the Veda is the name of *Agni*, the Fire-god (Latin *Ignis*), the divine priest of sacrifice; the Parsis, representatives of the religion of ancient Persia, whose most sacred place is the temple at the burning wells of Baku (p. 35), are typical fire-worshippers; among the old Greeks Hestia, the sacred hearth, was fed with fat and libations of sweet wine, and in Rome the ancient fire-cult was kept up in the temple of Vesta, with the eternal fire in her sanctuary. The Wind-gods are as well known to the North American Indians and the South Sea Islanders as they were to the Greeks, from whose religion they have come down to us so that every ploughman's child hears of rude Boreas and gentle Zephyr. To conclude the list, the Rivers have seemed beings so far greater than the little spirits of the brooks that they often, like Skamandros and Spercheios,

had temples and priests of their own; men swore by them, for they could seize and drown the perjurer in their floods, and to the Hindus still the most awful of oaths is by a divine river, above all the Ganges.

Such a list of gods, the vast souls of the sky, earth and sea, of the sun and moon, and the rest of the great powers of nature, each with his own divine personality, his own rational purpose and work in the world, goes far to explain polytheism, as it is found in all quarters of the globe. The explanation cannot, however, be complete, because both the names and natures of many gods have become confused. A deity worshipped in several temples is apt to split up into several deities, and men go on worshipping these by different names after their first sense is forgotten. Among nations who have become blended by alliance or conquest, the religions also mix, and the various gods lose their distinct personality. The classical dictionary is full of examples of all this. The thundering sky and the rainy sky, Jupiter Tonans and Jupiter Pluvius, came to be adored like two distinct beings. The Latin Neptunus and the Greek Poseidōn, put together into one because both were sea-gods, form a curious divine compound. Under the name of Mercurius, god of trade, comes in another ancient deity, the Greek Hermes, messenger of the gods, leader of the dead into the land of Hades, god of thieves and merchants, of writing and science, who himself bears traces of having been pieced together out of yet older deities, among them the writing-god of ancient Egypt, the ibis-headed Thoth. This will give a notion of the confusion which begins in religion as soon as the worshippers cease to think of a deity by his first meaning and purpose, and only know of him as the god so-and-so, whose image stands in such-and-such a temple. The wonder is not that the origin of so many ancient gods is now hard to make out, but that so many show so clearly as they do what they were at first, a divine ancestor, or a sun, or sky, or river. The gods of barbaric religion also show plainly at work, in the minds of the rude theologians, a thought destined to vast importance in higher stages of civilization. Regarding the world as the battle-ground of good and evil spirits, some religions see these ranged in two contending armies with higher good and evil gods over them, and above all the sovereign good deity and evil deity. This system of dualism, as it is called, is worked out in the contest between the powers of light and dark-

ness, under Ormuzd and Ahriman, the good and evil spirits, in the religion of ancient Persia. In barbaric stages of religion there appears also in rude forms the system of divine government, so well known in the faiths of more cultured nations. As among the worshippers themselves there are common men, and chiefs above them, and great rulers or kings above all, with high and low officers to do their bidding; so among their gods they frame schemes of lower and higher ranks of deities, with above all the majesty of a supreme deity. It is not agreed everywhere which god is to have this supremacy. As has been already said, men who look to the souls of the dead as their gods may hold even the highest divinity to be such a soul, an ancestor expanded into creator and ruler of the world Often, and naturally, the heaven-god is looked upon as supreme creator and controller of the universe. Among the nations of West Africa, some say Heaven does his will through his servants, the lesser spirits of the air, but others think him too high above to trouble himself much with earthly things. The doctrine of the Congo negroes shows a thoughtful, if not a happy, philosophy of life. They say it is the crowd of good and evil spirits, souls of the departed, who are still active in the concerns of life, and mostly the evil spirits have the best of it; but now and then, when they have made the world unbearable, the great Heaven rouses himself, terrifies the bad demons with his thunder, and lets fly his thunderbolts at the most obstinate; then he goes back to rest, and lets the spirits rule as before. A more cheerful view of nature-spirits working beneath heaven is familiar to us in the Homeric court of the gods on Olympus, where Zeus, the personal sky, sits enthroned above, holding sway over the lower gods of earth, air, and sea. In other countries the Sun may be looked upon as supreme, as he is among many hill-tribes of India, where he rules over the gods of the forest and the plain, the tribe-gods, and the ancestral ghosts. But the "Great Spirit," creator and controller of the universe, of whom we read in modern descriptions of the North American Indians, came from the teaching of the Jesuits in the seventeenth century; and similar divine beings elsewhere seem as little genuine. When the reader goes on to study the religion and philosophy of the ancient civilized world, he will find men's thoughts working in these same two ways towards pantheism or monotheism, according as they conceive the whole universe as one vast body animated by one divine

soul, or raise to the same divine height the one deity who reigns supreme over the rest. It lies beyond our range to follow this argument further here.

Let us now look at the chief acts of barbaric worship, which are not hard to understand when it is borne in mind that the deities they are paid to are actual human souls, or transformed human souls, or beings modelled on human souls. Even among savages, prayer is already found; indeed, nothing could be more natural than the worshipper should address with respectful words and entreaties for help a divine being who is perhaps his own grandfather. The prayers of barbarians have often been listened to and written down. Thus among the Zulus, the sacrificer says: "There is your bullock, ye spirits of our people. I pray for a healthy body that I may live comfortably, and thou so-and-so, treat me with mercy, and thou so-and-so" (mentioning by name the dead of the family). The following is part of a prayer of the Khonds, when offering a human sacrifice to the Earth-goddess: "By our cattle, our flocks, our pigs, and our grain we procured a victim and offered a sacrifice. Do you now enrich us. Let our herds be so numerous that they cannot be housed; let children so abound that the care of them shall be too much for the parents, as shall be seen by their burnt hands; let our heads ever strike against brass pots innumerable hanging from our roofs; let the rats form their nests of shreds of scarlet cloth and silk; let all the kites in the country be seen in the trees of our village, from beasts being killed there every day. We are ignorant of what it is good to ask for. You know what is good for us. Give it to us." These two specimens of prayers are chosen because they show how closely prayer is connected with sacrifice, how the offering is brought and the favour asked with it, just as would be done to a living chief. Barbaric sacrifices are not mere formal tokens of respect; they are mostly food, and will be consumed by the divinity, though he, being a spirit, is apt to take only the spirit, flavour, or essence, of the viands; or he snuffs up the steam or smoke as it ascends from the altar fire, a spiritual food of much the same thin ethereal substance which the spirit or god himself is thought to be of. It is in the higher religions that the sacrificial rite loses its grosser sense of feeding the deity, so that, although the drink-offering is still poured out and the bullock burnt on the altar, the act has

passed into the giving up of something prized by the worshipper, and a sign of adoration acceptable to the god.

There are several ways in which the worshipper can hold personal intercourse with his deities. These, being souls or spirits, are of course to be seen at times in dreams and visions, especially by their own priests or seers, who thus get (or pretend to get) divine answers or oracles from them. Being a soul, the god can also enter a human body, and act and speak through it, and thus hysterical and epileptic symptoms, which we have seen to be ascribed to an evil demon possessing the patient, are looked on more favourably when the spirit is considered to be a deity come to inspire his minister and talk by his voice. The convulsions, the unearthly voice in which the possessed priest answers in the name of the deity within, and his falling into stupor when his god departs, all fit together, and in all quarters of the world the oracle-priests and diviners by familiar spirits seem really diseased in body and mind, and deluded by their own feelings, as well as skilled in cheating their votaries with sham symptoms and cunning answers. The inspiration or breathing-in of a spirit into the body of a priest or seer appears to such people a mechanical action, like pouring water into a jug. Also, as in the ordinary transmigration of souls, a deity is considered able to enter into the body of an animal, as when he flies from place to place in the form of a sacred bird, or lives in the divine snake fed and worshipped among the negroes of the Slave coast. This leads on to a belief which seems still stranger to our minds. The modern Englishman wonders that a human being, however ignorant, should prostrate himself before a stake stuck in the ground or a stone picked up by the wayside, and even talk to it and offer it food; but when the African or Hindu explains that he believes this stock or stone to be a receptacle in which a divine spirit has for a time embodied itself, this shows that there is a rational meaning in the act. Images of gods, from the rudely carved figures of ancestors which the Ostyaks set up in their huts, to the Greek statues shaped by Phidias or Praxiteles to represent the heaven-god or the sun-god, are mostly formed in the likeness of man—an additional proof of how these nature-gods are modelled on human beings. When such images stand to represent gods, the worshipper may look on them as mere signs

or portraits, but commonly he is led by his spirit-philosophy to treat them as temporary bodies for the deities. A Tahitian priest, when asked about his carved wooden idol, would explain that his god was not always in the image, but only now and then flew to it in the body of a sacred bird, and at times would come out of the idol and enter his own (the priest's) body, to give divine oracles by his voice. This takes us back to the times when, fifteen hundred years ago, Minucius Felix describes the heathen gods entering into their idols and fattening on the steam of the altars, or creeping as thin spirits into the bodies of men, to distort their limbs and drive them mad, or making their own priests rave and whirl about. Lastly, rude tribes may believe in and worship spirits without having come to build houses for them and set up tables for their food. Yet such temples and altars appear far back in barbaric religion, and remain still with the thoroughly human character of the worship as plain as ever in them; as when in India the image of Vishnu is washed and dressed by his attendants, and set up in the place of honour in his temple with a choice feast before him, and musicians and dancing girls to divert him. This is the more instructive to us, because we know Vishnu before his original meaning was so spoilt, when he was a sun-god, an animating principle or soul of the sun in personal human shape, and thus a remnant of prehistoric natural philosophy.

We have hitherto only looked at barbaric religion as such an early system of natural philosophy, and have said nothing of the moral teaching which now seems so essential to any religion. The philosophical side of religion has been kept apart from the moral side, not only because a clearer view may be had by looking at them separately, but because many religions of the lower races have in fact little to do with moral conduct. A native American or African may have a distinct belief in souls and other spirits as the causes of his own life and of the events of the surrounding world, and he may worship these ghostly or divine beings, gaining their favour or appeasing their anger by prayers and offerings. But though these gods may require him to do his duty towards them, it does not follow that they should concern themselves with his doing his duty to his neighbour. Among such peoples, if a man robs or murders, that is for the party wronged or his friends to

avenge; if he is stingy, treacherous, brutal, then punishment may fall on him or he may be scouted by all good people; but he is not necessarily looked upon as hateful to the gods, and in fact such a man is often a great medicine-man or priest. While they hold also that the soul will continue to exist after death, flitting as a ghost or demon among the living or passing to the gloomy under-world or the shining spirit-land, they often think its condition will be rather a keeping-up of earthly character and rank than a reward or punishment for the earthly life. If some readers find it difficult to understand such theology separate from morals, they may be reminded how, among more civilized nations, religions may drop into the same state by losing the use of the moral laws they profess; as when a Hindu may lead the wickedest of lives, while the priests for gifts make his peace with the gods, or as in Europe brigands are notoriously devout church goers. As a rule, the faiths of the higher nations have more and better moral influence than the faiths of the ruder tribes. Yet even among savages the practical effect of religion on men's lives begins to show itself. The worship of the dead naturally encourages good morals; for the ancestor who, when living, took care that his family should do right by one another, does not cease this kindly rule when he becomes a divine ghost powerful to favour or punish. This manes-worship does not bring in new doctrines or reforms; indeed it is felt that nothing displeases the ancestral deity like changing the old customs he was used to. But for keeping up old-fashioned family goodness, the worship of ancestors has an influence over the many nations among whom it still prevails, from the Zulu, who believes that he must not ill-treat his brothers lest the father should come in a dream and make him ill, to the Chinese, who lives ever in presence of the family spirits, and fears to do wrong lest they should leave him to fall into distress and die. In the great old-world religions, where a powerful priesthood are the intellectual class, the educators and controllers of society, we find moral teaching fully recognised among the great duties of religion. The gods take on themselves the punishment of the wicked; the Heaven-god smites the perjurer with his thunderbolt, and the Nation-god brings sickness and death on the murderer. The doctrine of the transmigration of souls is brought to bear as a moral power; as where the Hindu books

threaten evil-doers with being reborn in other bodies in punishment for their sins done in this, when the wicked shall be born again blind or deformed, the scandal-monger shall have foul breath and the horse-stealer shall go lame, the cruel man shall be born as a beast of prey, the grain-stealer as a rat; and thus, eating the fruits of past actions, men shall work out the consequences of their deeds, souls sunk in darkness being degraded to brutes, while the good rise in successive births to become gods. Even more widely spread is the doctrine that man's life is followed by judgment after death, when evil-doers are doomed to misery, and only those who have lived righteously on earth will enter into bliss. How this doctrine prevailed in ancient Egypt, the papyrus strips of the Book of the Dead, and its pictures and hieroglyphic formulas on the mummy-cases, remain to show. Thus in any museum we may still see the scene of the weighing of the soul of the deceased, and his trial by Osiris, the judge of the dead, and the forty-two assessors, while Thoth, the writing-god, stands by to enter the dread record on his tablets. In the columns of hieroglyphics are set down the crimes of which the soul must clear itself, a curious mingling of what we should call ceremonial and moral sins, among them the following: "I have not privily done evil against mankind. I have not told falsehoods in the tribunal of Truth. I have not done any wicked thing. I have not made the labouring man do more than his task daily. I have not calumniated the slave to his master. I have not murdered. I have not done fraud to men. I have not changed the measures of the country. I have not injured the images of the gods. I have not taken scraps of the bandages of the dead. I have not committed adultery. I have not withheld milk from the mouths of sucklings. I have not hunted wild animals in the pasturage. I have not netted sacred birds. I am pure, I am pure, I am pure!" Thus, among the cultured old-world nations, already in the earliest historical ages theology had joined with ethics, and religion as a moral power was holding sway over society.

Animism, or the theory of souls, has thus been shown as the principle out of which arose the various systems of spirits and deities, in barbaric and ancient religions, and it has been noticed also, how already among rude races such beliefs begin to act on moral conduct. We here see under their simplest aspects the two sides of

religion, its philosophical and its moral side, which the reader should keep steadily in view in further study of the faiths of the world. In looking at the history of a religion, he will have to judge how far it has served these two great purposes—on the one hand that of teaching man how to think of himself, the world around him, the awful boundless power pervading all—on the other hand that of practically guiding and strengthening him in the duties of life. One question the student will often ask himself—how it is that faiths once mighty and earnest fall into decay and others take their place. Of course to no small extent such changes have come by conquest, as where in Persia the religion of Mohammed well nigh stamped out the old Zoroastrian faith of Darius and Xerxes. But the sword of the conqueror is only a means by which religions have been set up and put down in the world by main force, and there are causes lying deeper in men's minds. It needs but a glance through history at the wrecks of old religions to see how they failed from within. The priests of Egypt, who once represented the most advanced knowledge of their time, came to fancy that mankind had no more to learn, and upheld their tradition against all newer wisdom, till the world passed them by and left them grovelling in superstition. The priests of Greece ministered in splendid temples and had their fill of wealth and honours, but men who sought the secret of a good life found that this was not the business of the sanctuary, and turned away to the philosophers. Unless a religion can hold its place in the front of science and of morals, it may only gradually, in the course of ages, lose its place in the nation, but all the power of statecraft and all the wealth of the temples will not save it from eventually yielding to a belief that takes in higher knowledge and teaches better life.

CHAPTER XV

HISTORY AND MYTHOLOGY

Tradition, 110—Poetry, 111—Fact in Fiction, 113—Earliest Poems and Writings, 116—Ancient Chronicle and History, 117—Myths, 120—Interpretation of Myths, 127—Diffusion of Myths, 128.

HISTORY is no longer looked to for a record of the earliest ages of man. As the first chapter of this work shows, we moderns know what was hidden from the ancients themselves about the still more ancient ancients. Yet it does not at all follow that ancient history has lost its value. On the contrary, there are better means than ever of confirming what is really sound in it by such evidence as that of antiquities and language, while masses of very early writings are now newly opened to the historian. It was never more necessary to have clear ideas of what tradition, poetry, and written records can teach as to the times when history begins.

The early history of nations consists more or less of traditions handed down by memory from ages before writing. Our own experience does not tell us much as to what such oral tradition may be worth, for it has so fallen out of use in the civilised world that now one knows little of what happened beyond one's great-grandfather's time, unless it has been written down. But writing has not yet quite overspread the globe, and there are still peoples left whose whole history is the tradition of their ancestors. Thus the South Sea Islanders, who till quite lately had no writing, were intelligent barbarians, much given to handing down recollections of bygone days, and, in one or two cases which it has been possible to test among them, it seems as though memory may really keep a historical record long and correctly. It is related by Mr. Whitmee the missionary that in the island of Rotuma there was a very old tree, under which according to tradition, the stone seat of a famous chief had been buried; this tree was lately blown down, and, sure enough, there was a stone seat under its roots, which must have been out of sight for centuries.

In the Ellice group, the natives declared that their ancestors came from a valley in the distant island of Samoa generations before, and they preserved an old worm-eaten staff, pieced to hold it together, which in their assemblies the orator held in his hand as the sign of having the right to speak; this staff was lately taken to Samoa, and proved to be made of wood that grew there, while the people of the valley in question had a tradition of a great party going out to sea exploring, who never came back. Among these Polynesian traditions the best known are those handed down by the Maoris as to the peopling of New Zealand by their ancestors. They tell how, after a civil war, their forefathers migrated in canoes from Hawaiki in the far north-east; they give the names of the builders and crews of these vessels and show the places where they landed; they repeat, generation by generation, the names of the chiefs descended from those who came in the canoes, by which they reckon about eighteen generations, or 400 to 500 years, since their taking possession of the islands. Notwithstanding that, as might be expected, the traditions of various districts disagree a good deal, they are admitted as the title-deeds by which the natives hold land in the right of their ancestors who landed in the canoes Shark (*Arawa*) and God's-Eye (*Mata-atua*), and it can hardly be doubted that such genealogies, constantly repeated among people whose lands depended on them, are founded on fact. Yet these Maori traditions are about half made up of the wildest wonder-tales; when the builder of one of the canoes cuts down a great tree to make the hull, on coming back to the forest next morning he finds that the tree has got up again in the night; and when the canoe is finished and puts to sea, a certain magician is left behind, but on getting to New Zealand there he is before them on the shore, having come across the ocean on the back of a sea-monster, like Arion on his dolphin. These traditions of a modern barbarous people may give us not an unfair idea of the mixture of real memory and mythic fancy in the early history of Egypt or Greece, where it has come down by tradition from the distant past when there was as yet no scribe to engrave on a stone tablet even the names of kings.

Traditions are yet more lasting when handed down in fixed words, which is especially when the poets have set them in verse. Even now in England some notable event may be made into a ballad and sung through the

length and breadth of the land. In days before printing, the importance of the poet as historian was far greater, and many an old European chant has touches of true chronicle. The old songs of Brittany are often very true to history, as where in one there is mention of Bertrand du Guesclin's hair being like a lion's mane, and in another, Jeanne de Montfort (Jeanne-la-Flamme), going forth from Hennebont with sword and burning brand to fire the French camp, is described as putting on her suit of armour, which history elsewhere records that she really wore. But though the poet or minstrel preserves many picturesque incidents like these, he has not the historian's conscience about facts. Eager to rouse and delight his audience, to flatter the national pride of his people and the family pride of the chieftain in whose halls he sang, the singer brought in real names and events, but he shifted them as would best suit his dramatic scenery, or he even made his own history outright. The great German epic, the Nibelungen Lied, begins in Burgundy, where the three kings hold court at Worms on the Rhine, their sister is the lovely Kriemhilt, whose husband Sîfrit is treacherously slain at the well by Hagen's spear; afterwards she marries Attila the Hun-king, and the tale of blood, ending with her vengeance and death, leaves Attila and Theodoric of Verona (Etzel and Dietrich von Bern) weeping together over the slaughter of their men. Here are places and personages historical enough to make a poem history, if history could be made by such means; but the reader of Gibbon knows that Attila really died two years before Theodoric was born. In fact the poem is a late version of a story preserved in an earlier shape in Scandinavia as the saga of the Volsungs; the court at Worms, and the tournament, and the rest of the historic names and local circumstances, are worked in to give poetic substance and colour. If poets ventured thus to falsify history in the Middle Ages, when the chronicles were there to convict them, how are we to tell fact from fiction in the poems of ages where the check of history is wanting? The Iliad and the Odyssey may contain many memories of real men and their deeds, an Agamemnon may have reigned in Mykēnai, there may have been a real siege of Troy, perhaps round the very mound where Schliemann has dug out the golden cups and necklace. But it is too hard a task to sift out historic truth in Homer, where natural events are as hopelessly mixed

up with miracles as in the Maori legends. It is too hard to judge how far chronicles of old nations are impartially preserved by a bard whose rule it is (as Mr. Gladstone points out in his *Primer of Homer*) that no considerable Greek chieftain is ever slain in fair fight by a Trojan. Were nothing to be had out of ancient poetry except distorted memories of historical events, the anthropologist might be wise to set it aside altogether. Yet, looked at from another point of view, it is one of his most perfect and exact sources of knowledge.

Although what the poet relates may be fiction, what he mentions is apt to be history. In the names of nations and countries and cities, he is unconsciously portraying for us the world and its inhabitants as they were in his time. The catalogue of ships and men in the second book of the Iliad is a chart and census of the Mediterranean. Homer knows of the Egyptians, their irrigated fields and their skill in medicine, and of the ship-famed Phœnicians and their purple stuffs. The name of Kadmos belongs to the Phœnician tongue, and signifies the "Eastern," while the "seven-gated" Thebes built by his people shows that they had that reverence for the mystic number seven, which has its origin in the worship of the seven planets in Babylon. The poet can hardly have thought, when he told his wonder-tales with the circumstances of the actual world around him, how future ages would prize for itself that record of real life. Odysseus, clinging under the belly of the great ram, or sailing to the land of Hades to the weak shades of the dead, is mere myth. Yet the description of Polyphēmos is one of the few ancient pictures of the manners of low barbarians, and the visit to Hades is a chapter of old Greek religion, recording what men thought of the dull ghost-life beyond the tomb. So it is with the descriptions of life and manners. Nausikaa, the king's daughter, drives the wain with the pair of mules down to the river's mouth to carry the clothes to be washed. Odysseus walks through the streets of the seafaring Phaiakians, wondering at the haven and the mighty walls and bastions, till he crosses the bronze threshold of the palace of Alkinoos, and, entering, clasps the knees of Queen Arētē; then he crouches on the hearthstone in the ashes, till the king, mindful of Zeus the Thunderer standing near to care for the suppliant, takes the guest by the hand, and makes him sit by him on his own son's glittering seat. Thus, following the romantic

fortunes of the many-wiled Odysseus, we see as in the scenes of a dissolving-view how the heroes of old days went spear in hand with their swift dogs at their heel, how at the house-door they threw aside their garments to go into the bath-chamber, and came forth anointed with oil to the feast where with no such refinements as plates or knives they ate their fill of roast meat and cakes of bread; how they diverted themselves with throwing quoits on the smooth turf, or lounged on outspread hides in the sunshine playing merells; how in solemn rites they poured the libations of dark wine and burned the meat in sacrifice, with prayers for what their hearts desired, yet knowing all the while that the gods would, as they listed, this grant and that deny. All this is not only history, but history of the finest kind. Looked at by the student of culture, even the wild mixture of the natural and supernatural, so bewildering to the modern mind, is the record of an early stage of religious thought. The gods meet in council in the halls of cloud-gathering Zeus, to settle what shall be done with their contending armies of worshippers on the plains below. In the very fray of mortal warriors divine beings take part; Poseidōn plucks out the bronze-tipped spear from the shield of Aineias, lifts up the Trojan hero and bears him away unharmed over the heads of the warriors; even the goddesses set on one another like mortal shrews, when Hērē tears away the bow and quiver of Artemis, and with scornful laughter boxes her ears with them till the virgin huntress goes off in tears, leaving her bow behind. It would be wrong to think that all this seemed mere make-believe and poetic ornament to the men who first listened to the wondrous rhapsodies. They were in the changing state of religion described in the last chapter (see p. 102) when the spiritual beings, which to their ruder forefathers had served as personal causes of nature and events, were passing away from their first clearness, yet were still regarded as divinities presiding over nature and interfering with men's lives. Contrasting such a state of thought with that of the present day will help us to realize one of the greatest events in all history, the change of men's minds from the mythological temper to the historical temper. This change did not happen all at once, but has for many ages been gradually coming about. There is hardly a more instructive chapter in Grote's *History of Greece* than that in which he describes the philosophic age, when the Greeks were

beginning to notice with perplexity and pain that the Homeric poems, become to them a sacred book, agreed but ill with their own experience of life, so that they asked themselves, can the world have really so changed since the days when men sat at table with the gods?

Much of what is called ancient history has to be looked at in this way. Historical criticism, that is, judgment, is practised not for the purpose of disbelieving but of believing. Its object is not to find fault with the author, but to ascertain how much of what he says may be reasonably taken as true. Thus a modern reader may have a sounder opinion about early Roman history than the Romans themselves had in the time of Livy and Cicero. We see more plainly than they that the name of Rome is less likely to have been given from a man called Romulus, than that the name of Romulus was invented to account for the city being called Rome. To modern minds, the whole famous story of the wolf-fostermother of Romulus and Remus collapses when it is known to be only a version of the same old wonder-tale told by Herodotus as the story of the birth of Cyrus. Yet here again may be seen the indirect value of history even where its events are most questionable. Though there may never have been any such person as Romulus, the legend of the tracing of the city walls by his bronze plough-share is a true record of the ceremony with which cities were anciently founded. Even later history, where the historian had written records to go upon, must often be sifted in this way. Suppose a class reading the 35th book of Livy. Such matters as Hannibal's oath, and the preparations for war with Antiochus, are taken without question as good history. But when it comes to the story that about this time an ox belonging to one of the consuls uttered the awful words "Roma, cave tibi!" there is a laugh. Here it is not enough for the form-master simply to pass the story by as Livy's nonsense. He has to admit that the historian probably took it from the official record of prodigies, so that at any rate it is good historical evidence that in ancient Rome men not only believed that an ox might speak, but that its so doing would be a divine portent, and notions of this kind had so become part of the national religion and government that the augurs took care a regular supply of such omens should be forthcoming to guide the rulers of the state, or at least to enable them to impose upon the multitude. Thus the passages of

history which seem at first sight most silly and false may be solid facts in the history of civilization.

It is plain that the compositions which serve as records of old-world life need not have been intended as history. If only the genuine words and thoughts of the ancients about anything have been handed down, it is for the moderns to extract history from them. Thus the Sanskrit hymns collected in the Veda serve as a record of the daily life of the early Aryans who chanted them. For when a hymn to the wind gods brings them in as driving in chariots with strong felloes and well-fashioned reins and cracking whips, then it is plain to the modern reader that the Aryan people among whom the hymn was made drove themselves in such chariots. Where the bright gods have gold chains on their breasts for beauty, carry spears on their shoulders and daggers at their sides, this mythical fancy gives a real picture of the accoutrement of the Aryan warrior. Thus, piece by piece, this prehistoric hymn-book shows the old patriarchal Aryan life, with the herds of cattle roaming over wide pastures or shut in the winter cow-stall, the ploughing of the fields and the reaping of the corn, the family ties and legal rights, the worship of the great nature-gods of sky and earth, sun and dawn, fire and water and winds, the intense belief in the shining regions of the immortal dead, the honour to the almsgiver and praise to the just man. In the sacred books of the old Persians, collected in the Avesta, have come down the long-remembered traditions of another branch of the Aryan race, who, dividing off from their Brahman kinsfolk, followed the faith of Zarathustra. The deep schism between the two religions is seen in the Zarathustrians having degraded the bright gods (*deva*) of the Brahmans into evil demons (*daeva*). Their horror of defiling the sacred fire by burning corpses as the Brahmans do had already led them to expose the dead to be devoured by wild beasts and carrion birds, as the Parsis still do in their "towers of silence." In the beginning of the Avesta, there is mentioned as first and best of the good regions created by the good deity, the country called *Airyana vaejo*, the "Aryan power," which afterwards the evil deity cursed with ten months' winter; this description of the climate looks as though the old Persians believed their early Aryan home was on the bleak slopes of Central Asia toward the sources of the Oxus and Yaxartes. Here and there among the sacred

verses comes a touch of the life of these proud fierce herdsmen and tillers of the soil, little like the corrupt Persian and the thrifty Parsi of modern times. Their enthusiasm for the rough work of making the earth fit for man's abode is quaintly shown where they sing of the delight the earth feels when the husbandman drains the wet soil and waters the dry, how she brings wealth to him who tills her with the right arm and the left, with the left arm and the right :

> "When the corn grows, then the demons hiss;
> When the shoots sprout, then the demons cough;
> When the stalks rise, then the demons weep;
> When the thick ears come, then the demons fly."

So necessary were the fierce dogs which kept the wolf from the fold and the thief from the village, that there are solemn ordinances about them, how the dog who does not bark and is not right in his mind is to be muzzled and tied up, and what punishment is to be inflicted on the man who gives a dog bad food; it is as sinful (they say) as if he had done it to a well-to-do householder. One forms a lifelike picture of the sturdy farmers who made these laws to be repeated to their children's children and carried on to future ages.

While these rough Aryans were handing on memories of the past by word of mouth in their sacred verses, more cultured nations had long since begun to write down memorials of their own times. The best way to bring to our minds what this earliest contemporary history was like is to look at the translations of Egyptian and Assyrian documents in *Records of the Past*, published under the directions of the *Society of Biblical Archæology*. Here is to be found, for instance, Dr. Birch's translation of the inscription recording the expeditions of Una, crown-bearer to king Teta, before 3,000 B.C. (see vol. i. p. 3), and of the account on the sanctuary walls of Karnak, of the battle of Megiddo, where Thothmes III., about 1,500 B.C., overcame the armies of Syria and Mesopotamia and opened the way into the interior of Asia. It is related how the king, marching from Gaza, reached the south of Megiddo on the shore of the waters of Kaner, where he pitched his tent and made a speech before his whole army: "Hasten ye, put on your helmets, for I shall rush to fight with the vile enemy in the morning!" The watchword was passed, "Firm, firm, watch, watch, watch actively at the king's pavilion!" It was on the morning of the festival of the

new moon that the king went forth in his golden decorated chariot in the midst of his army, the god Amun being the protection in his active limbs, and he prevailed over his enemies; they fell prostrate before him, left their horses and chariots, and fled to the fort, where the garrison shut up inside pulled off their clothes to haul them up over the walls. The Egyptians slaughtered their enemies till they lay in rows like fish, and, conquering, entered the fort of Megiddo, where the chiefs of the land came bearing tribute, silver and gold, lapis lazuli and alabaster, vessels of wine and flocks. The lists of spoil, made with curious minuteness, include living captives 240, hands (cut off the dead) 83, mares 2,041, fillies 191, an ark of gold of the enemy, 892 chariots of the vile army, and so on. A later part of the inscription commemorates the liberal endowments bestowed by the victorious king on the god Amen Ra, the fields and gardens to supply his temple, the pairs of geese to fill his lakes, to supply him with the two trussed geese daily at sunset, a charge to remain for ever, and so on with the loaves of bread and pots of beer for daily rations. As the king says in his inscription, he does not boast of what he has done, saying that he has done more when he has not, and so causing men to contradict him. Here we see the check of public opinion beginning to act in history. It does not really compel exact truth, it allows national victories to be exaggerated and defeats kept out of sight, but even the vainglorious scribes of Egypt would hardly venture to record events without a foundation of fact. Turning now to the inscriptions of the Babylonian-Assyrian district, we may take as an example a temple-brick of the famous city Ur of the Chaldees, now called Mugheir, which bears these words in cuneiform writing :

> "To the Moon-god, the eldest son of Mul-lil his king,
> Ur-bagas, the powerful prince, the fierce warrior,
> The king of Ur, the king of Sumir and Akkad,
> Has built È-Tem-ili the temple of his choice."

Sumir and Akkad, here mentioned, were the seats of the old Chaldæan civilization. As early as the 16th century B.C., Hammurabi overcame these nations, a great event in the change that absorbed their ancient culture and religion into the conquering Assyrian empire. In an inscription of this king of Babylon, he says, "the favour of Bel gave into my government the people of Sumir

and Akkad, for them I dug out afresh the canal called by my name, the joy of men, a stream of abundant waters for the people, all its banks I restored to newness, new supporting walls I heaped up, perennial waters I provided for the people of Sumir and Akkad."

By the aid of such contemporary writings, historians are now able to check the recorded lists of ancient kings, and to piece together something like a continuous line of dynasties in Egypt and Babylonia since the foundation of the great cities Memphis and Ur. We may notice where the records and traditions of the Israelites, written down in later ages in the historical books of the Old Testament, come in contact with ancient history from the monuments. Israelite tradition records (Gen. xi., xii.) that their ancestors had been in the Chaldæan district of Ur, and in Egypt, which is evidence of their intercourse with the two great nations of the ancient world. The mention in Exodus (i. 11) of the Israelites being set to build for Pharaoh a city called Rameses, points to their oppression in Egypt having been under the Great Rameses II. of the XIX. dynasty, apparently about 1400 B.C., which makes a point of contact between Egyptian and Hebrew chronology. In the Books of Kings there come into view later persons and events, well known in the contemporary records of other countries, as in the mention of Shishak, king of Egypt, who fought against Rehoboam and plundered the temple (1 K. xiv. 25). It seems likely, when Herodotus (ii. 141) describes the army of Sennacherib, king of Assyria, being put to flight from the mice gnawing the soldiers' bows, that this is a version of the great disaster of Sennacherib, of which the Bible gives a different account (2 K. xix.).

With Herodotus the student comes in view of the Old World as it was known to a Greek traveller and geographer of the 5th century B.C. The Father of History, as he has been called, wrote not as a chronicler of his own nation, but with the larger view of an anthropologist to whom all knowledge of mankind was interesting. The way in which modern discoveries have come in to confirm his statements justifies us in relying on ancient historians when, like him, they are careful to distinguish mere legend or hearsay from what they have themselves enquired into. Thus Herodotus tells the strange story of the impostor who passed himself off as Smerdis, and sat on the throne of Persia till he was detected by his

cropped ears, and Darius slew him. When, a few years ago, the cuneiform characters of the inscription sculptured in a high wall of rock near Behistan in Persia were deciphered, it proved to be the very record set up by Darius the king in the three languages of the land, and it matches the account given by Herodotus closely enough to show what a real grasp he had of the course of events in Persia a century before his time. Yet more remarkable is the test which can be put to what Herodotus says he learnt from the priests in Egypt about their kings who reigned 2000 years before. From their dictation he wrote down the names of the pyramid-kings Cheops, Chephren, Mykerinos. In later ages critics had sometimes come to doubt whether these kings belonged to fact or fable, but when the lost meaning of the Egyptian hieroglyphics was anew interpreted by modern scholars, there stood the names recognisable as the Greek historian heard them. The best ancient history is apt to receive such confirmation from long-lost monuments. Thucydides relates (vi. 54) that Peisistratos (the younger) dedicated two altars, from one of which the Athenians erased the inscription, but the other (the historian says) may still be read, though in faint letters : " this monument of his archonship Peisistratos son of Hippias set up in the enclosure of Pythian Apollo." Part of this very stone with its inscription was found in 1878 in a courtyard near the Ilissos, and is now in a museum in Athens. How lively a sense of reality such monuments give to history may be understood by the student who, fresh from his books, goes to the British Museum and sees among the ancient coins the grand head of Alexander the Great with the ram's horns, commemorating that curious episode of his life when he was declared to be son of Zeus Ammon; or who notices with surprise the gold coins that prove Cymbeline, now best known in Shakspere, to have been a real British king who coined money with his name.

Having thus looked at the sources of early history as belonging to the study of mankind, we need not go over the well-trodden ground of later history. It remains to notice myth, the stumbling-block which historians have so often fallen over. Myth is not to be looked on as mere error and folly, but as an interesting product of the human mind. It is sham history, the fictitious narrative of events that never happened. Historians, especially in writing of early ages, have copied down the

traditions of real events so mixed up with myths that it is one of the hardest tasks of the student to judge what to believe and what to reject. He is fortunate when he can apply the test of possibility, and declare an event did not happen because he knows enough of the course of nature to be sure it could not. For instance, cultured nations have learnt from science that what appears to be a blue dome or firmament above our heads, the sky or heaven, is not really the solid vault the ancients thought it was, but only thin air and watery vapour. The consequence of knowing this is that people have had to strike out of their history the old myths of gods dwelling in palaces and holding courts in the skies, of men climbing or flying up from earth into heaven, of giants heaping mountain Ossa on Pelion, to scale the cloudy heights and wage battle with the gods above. Besides this way of detecting myth by its relating what could not have taken place, there are other means of judging it. It is often possible to satisfy oneself that some story is not really history, by knowing the causes which led to its being invented.

We know how strong our own desire is to account for everything. This desire is as strong among barbarians, and accordingly they devise such explanations as satisfy their minds. But they are apt to go a stage further, and their explanations turn into the form of stories with names of places and persons, thus becoming full-made myths. Educated men do not now consider it honest to make fictitious history in this way, but people of untrained mind, in what is called the myth-making stage, which has lasted on from the savage period and has not quite disappeared among ourselves, have no such scruples about converting their guesses at what may have happened into the most life-like stories of what they say did happen. Thus, when comparative anatomy was hardly known, the finding of huge fossil bones in the ground led people to think they were the remains of huge beasts, and enormous men, or giants, who formerly lived on the earth. Modern science decides that they were right as to the beasts, which were ancient species of elephant, rhinoceros, &c., but wrong as to the giants, none of the great bones really belonging to any creature like man. But while the belief lasted that they were bones of giants, men's imagination worked in making stories about these giants and their terrific doings, stories which are told still in

all quarters of the globe as though they were traditions of real events. Thus the Sioux of the western prairies of North America say their land was once inhabited by great animals, bits of whose bones they still keep for magic, and also they tell of the giant Ha-o-kah, who could stride over the largest rivers and the tallest pines, and to whom they sing and dance at their festivals. It appears that fossil bones, very likely of the mastodon, had to do with this native belief in old monstrous beasts, nor need we be surprised at the giants coming into the story, considering that so lately as the last century Dr. Cotton Mather, the Puritan divine, sent to our Royal Society an account of the discovery of such bones in New England, which he argued were remains of antediluvian giants.

Another thing which in all parts of the world has set the imagination of myth-makers to work, is the fact that people live in tribes or nations, each known by a particular name, such as Ojibwa, Afghan, Frank. The easiest and favourite way of accounting for this is to suppose each tribe or nation to have had an ancestor or chief of the like name, so that his descendants or followers inherited their tribe-name from him. It really happens so sometimes, but in most cases a pretended tradition of such an eponymic or name-ancestor arises from the makers of genealogies first inventing him out of the name of the tribe, and then treating him as a historical personage. They may now and then be caught in the act of doing this. Thus among the native race of Brazil and Paraguay, some tribes are called *Tupi* and others *Guarani*, so to account for this division, a tradition is related that two brothers named *Tupi* and *Guarani* came over the sea to Brazil, and with their children peopled the country, but a talking parrot made strife between the wives of the two brothers, and this grew into a quarrel and separation, Tupi staying in the land, and Guarani going off with his family into the region of La Plata. Now there happens to be a means of checking this story, for Martius says that the name guarani (meaning warrior) was first given by the Jesuits to the southern Indians whom they collected in their missions, so that the tale of the two ancestor-brothers must be a myth of modern manufacture. Such eponymic myths of national ancestors were not only made in ancient times, but are mixed up in the chronicles of Old World nations as though they were real history. The classical student

knows the legends of the twin brothers *Danaos* and *Aigyptos*, ancestors of the *Danaoi* (Greeks) and *Ægyptians;* and of *Hellēn*, father of the *Hellēnes*, whose three sons *Aiolos, Dōros, Xouthos* (father of *Achaios* and *Iōn*), were fathers of the *Æolians, Dorians*, &c.

Having looked at these two frequent kinds of myths derived from fossil bones and national names, it is worth while to notice how both come together in our own country. The History of the Britons, compiled in the 12th century by Geoffrey of Monmouth, relates that our island was in old time called Albion, and was only inhabited by a few giants; but *Brutus*, a banished Trojan prince, landed with his followers and called the land *Britain*, after his own name, and his companions *Britons*. With him came a leader called *Corineus*, and he called the part of the country which fell to him *Corinea* and his people *Corineans*, that is, *Cornish*. In that part the giants were most numerous, and one especially, named *Goemagot* (elsewhere called *Gogmagog*) was twelve cubits high, and could pull up an oak like a hazel wand. On a certain day, when there had been a battle and the Britons had overcome a party of giants and slain all except this hugest monster, he and Corineus had a wrestling-match, when Corineus caught the giant up in his arms, and running with him to the top of the cliff now called the Hoe at Plymouth, cast him over, wherefore (says the chronicler) the place is called "Goemagot's leap" to this day. Quaint as this legend is, it is not hard to find the sense of it. It was the fashion to trace the origin of nations from Troy; *Brutus* and *Corineus* were invented to account for the names of *Britain* and *Cornwall; Goemagot* or *Gogmagog* is the Biblical *Gog* and *Magog* rolled into one, these personages being recognised in tradition as giants. But why the story of his having been thrown over the Hoe at Plymouth? The answer seems to be that this is a place where the bones of fossil animals are actually dug up, such as were looked upon as remains of giants. Even in modern times, when excavations were being made on the Hoe for the fortifications, huge jaws and teeth were found, which were at once settled by public opinion to be the remains of Gogmagog.

These are examples of the myths easiest for modern civilised minds to enter into, for they are little more than inferences or guesses as to what may have actually happened, worked up with picturesque details which

give them an air of reality. But to understand another kind of myths we must get our minds into a mood which is not that of scientific reasoning in the class-room, but of telling nursery tales in the twilight, or reading poetry in the woods on a summer afternoon. Former chapters have shown how, in old times and among uncultured people, notions of the kind which still remain among us as poetic fancy were seriously believed. When to the rude philosopher the action of the world around him was best explained by supposing in it nature-life like human life, and divine nature-souls like human souls, then the sun seemed a personal lord climbing proudly up the sky, and descending dim and weary into the under-world at night; the stormy sea was a fearful god ready to swallow up the rash sailor; the beasts of the forest were half-human in thought and speech; even the forest-trees were the bodily habitations of spirits, and the woodman, to whom the rustling of their leaves seemed voices, and their waving branches beckoning arms, hewed at their trunks with a half-guilty sense of doing murder. The world then seemed to be "such stuff as dreams are made on;" transformation of body and transmigration of spirit were ever going on; a man or god might turn into a beast, a river, or a tree; rocks might be people transformed into stones, and sticks transformed snakes. Such a state of thought is fast disappearing, but there are still tribes living in it, and they show what the men's minds are like who make nature-myths. When a story-teller lives in this dreamland, any poetic fancy becomes a hint for a wonder-tale, and though (one would think) he must be aware that he is romancing, and that the adventures he relates are not quite history, yet when he is dead, and his story has been repeated by bards and priests for a few generations, then it would be disrespectful, or even sacrilegious, to question its truth. This has happened all over the world, and the Greek myths of the great nature-gods which Xenophanes and Anaxagoras ventured to disbelieve with such ill consequences to themselves were of much the same fabric as those of modern barbarians like the South Sea Islanders. Let us look at a few nature-myths, choosing such as most transparently show how they came to be made.

The Tahitians tell tales of their sea-god Hiro, whose followers were sailing on the ocean while he was lulled to sleep in a cavern in the depths below; then the wind-

god raised a furious storm to destroy the canoe, but the sailors cried to Hiro, till, rising to the surface, he quelled the storm, and his votaries came safe to port. So in Homer, Poseidōn the sea-god, dweller in caves of ocean, sets on the winds to toss the frail bark of Odysseus among the thundering waves, till Ino comes to his rescue and bids him strip and swim for the Phaiakian shore. Both tales are word-pictures of the stormy sea told in the language of nature-myth, only with different turns. The New Zealanders have a story of Maui imprisoning the winds, all but the wild west-wind, whom he cannot catch to shut into its cavern by a great stone rolled against its mouth; all he can do is to chase it home sometimes, and then it hides in the cavern, and for a while dies away. All this is a mythic description of the weather, meaning that other winds are occasional, but the west wind prevalent and strong. These New Zealanders had never heard of the classic myth of Æolus and the cave of the winds, yet how nearly they had come to the same mythic fancy, that it is from such blow-holes in the hill-sides that the winds come forth. The negroes of the West Indies tell a tale of the great quarrel between Fire and Water, how the Fire came on slowly, stopped by the stream, till he called the Wind to his aid, who carried him across everything, and the great fight came off, the Bon Dieu looking on from behind a curtain of clouds. It is not likely that these negro slaves had ever heard of the twenty-first Iliad, to know how the same world-old contest of the elements is told in the great battle between the Fire-god and the Rivers, when the Winds were sent to help, and carried the fierce flames onward, and the eels and fish scuttled hither and thither as the hot breath of the blast came upon them.

The beams of light darting down from the sun through openings in the clouds seem to have struck people's fancy in Europe as being like the rope over the pulley of an old-fashioned draw-well, for this appearance is called in popular phrase, "the sun drawing water." The Polynesians also see the resemblance of the rays to cords, which they say are the ropes the sun is fastened by, and they tell a myth how the sun once used to go faster, till a god set a noose at the horizon and caught him as he rose, so that he now travels bound and slowly along his daily appointed path. In English such an expression as that the sun is "swallowed up by night" is now a mere metaphor, but the idea is one which in

ancient and barbaric times people took more seriously. The Maoris have made out of it the story of the death of their divine hero Maui. You may see, they say, Maui's ancestress, Great-Woman-Night, flashing and as it were opening and shutting out on the horizon where sea and sky come together; Maui crept into her body and would have got through unharmed, but just at that moment the little flycatcher, the *tiwakawaka*, broke out with its merry note and awoke the Night, and she crushed Maui. That at least one bird which sings at sunset figures in a version of this story suggests its being a nature-myth of the setting sun dying as he plunges into the darkness. Of all the nature-myths of the world, few are so widely spread as those on this theme of night and day, where with mythic truth the devoured victims were afterwards disgorged or set free. The Zulu story-tellers describe the maw of the monster as a country where there are hills and houses and cattle and people living, and when the monster is cut open, all the creatures come out from the darkness; with a neat touch of nature which shows that the story-teller is thinking of the dawn, the cock comes out first, crying, "*kukuluku!* I see the world!" Our English version of the old myth is the nursery tale of Little Red Riding-hood, but it is spoilt by leaving out the proper end (which German nurses have kept up with better memory), that when the hunter ripped up the sleeping wolf, out came the little damsel in her red satin cloak, safe and sound.

Such stories are fanciful, but the fancy of the myth-maker can take yet further flights. The mythic persons as yet described have been visible objects like the sun, or at least what can be perceived by the senses and made real objects of, such as wind, or day. But when the poet is in the vein of myth-making, whatever he can express by a noun and put a verb to becomes capable of being treated as a person. If he can say, summer comes, sleep falls on men, hope rises, justice demands, then he can set up summer and sleep, hope and justice, in human figures, dress them, and make them walk and talk. Thus the formation of myth is helped by what Professor Max Müller has called a "disease of language." This, however, is not the whole matter. We saw in the last chapter how the notion of soul or spirit helped men on to the notion of cause. When the cause of anything presents itself to the ancient mind as a kind of soul or spirit, then the cause or spirit of summer, sleep, hope

justice, comes easily to look like a person. No one can really understand old poetry without knowing this. Homer could fancy on the field of battle the awful *Kēr*, whose figure was shown on the shield of Achilles with blood-stained garment flung over her shoulders, as she seized some warrior wounded to the death, or dragged a corpse by the feet out of the fighting throng. This being is not merely a word turned into a reality, she is a personal cause, a spirit-reason, why one warrior is slain and not another. So far is the idea of her spread in Aryan mythology, that it appears again among the Northmen, when Odin sends to every battle the maidens who in Walhalla serve the feast and fill the bowls with ale for the spirits of the heroes; these maidens are the Valkyriur, who guide the event of victory, and choose the warriors who shall fall. Another well-known mythic group shows again how what to us moderns are but ideas expressed in words took personal form in the minds of the ancients. In the classic books of Greece and Rome we read of the three fate-spinners, the Moirai or Parcæ, and their Scandinavian counterparts appear in the Edda as the three wise women whose dwelling is near the spring under the world-ash Yggdrasil, the Norns who fix the lives of men. The explanation of these three mythic beings is that they are in personal shape the Past, Present, and Future, as is shown by the names they bear, *Was, Is, Shall* (*Urdhr, Verdhandi, Skuld*).

Stories are always changing and losing their meanings, and from age to age new bards and tale-tellers shape the old myths into new forms to suit new hearers. Considering how stories thus grow and change, one must expect their origins to be as often as not lost beyond recovery. While, as we have seen, it may be often possible to make out what they came from, this must be done cautiously. Clever writers are too apt to sit down and settle the mythic origin of any tale, as if this could be done by ingenious guessing. Even if it is nonsense and never was intended for anything else, the myth-interpreter can find a serious origin for it all the same. Thus a learned but rash mythologist declares that in our English nursery rhyme, "the cow jumped over the moon," is a remnant of an old nature-myth, describing as a cow a cloud passing over the moon. What is really wanted in interpreting myths is something beyond simple guessing; there must be reasons why one particular guess is more probable than any other. Con-

stellation-myths, combining name and nature, are models of plain meaning. Among the Pleiad sisters, Merope is hard to see, and myth says she hides for shame of her mortal husband; these Pleiads are chased down to Ocean by the hunter Orion, who himself disappears in the light of Dawn, carried off, as Homer has it, by rosy-fingered Eōs. We may choose another example from the mythology of India, in the story of Vâmana, the tiny Brahman, who, to humble the pride of King Bali, begs of him as much land as he can measure in three steps, but when the boon is granted, the little dwarf expands into the gigantic form of Vishnu, and, striding with one step across the earth, another across the air, and a third across the sky, drives Bali down into the infernal regions, where he still reigns. This most remarkable of all the Tom Thumb stories seems really a myth of the sun, rising tiny above the horizon, then swelling into majestic power and crossing the universe. For Vâmana, the "dwarf," is one of the incarnations of Vishnu, and Vishnu was originally the Sun. In the hymns of the Veda the idea of his three steps is to be found before it had become a story, when it was as yet only a poetic metaphor of the Sun crossing the airy regions in his three strides. "Vishnu traversed (the earth), thrice he put down his foot; it was crushed under his dusty step. Three steps hence made Vishnu, unharmed preserver, upholding sacred things."

It remains to see how myths spread. Whenever a good story is told, whether real or made-up does not matter, it becomes part of the story-teller's stock, who puts to it any new name that will suit, and often succeeds in planting it not only in popular legend, but even in history. There is a fragment by Demaratus preserved in the collection of Stobæus, where there is related with Greek names, as an episode of the history of Arkadia, the grand story which we were taught as an event of Roman history, the legend of the Horatii and Curiatii. Roman history, it seems, only borrowed it from an earlier tale, much as modern Swiss history borrowed from older folklore the tale of the archer and the apple to adorn their national hero, Tell. To show how legend is put together from many sources, historical and mythical, let us take to pieces one of the famous children's tales of Europe. Blue Beard was a historical person. He was Gilles de Retz, Sieur de Laval, Marshal of France, nicknamed Barbe Bleue from having a beard of

blue-black shade. Persuaded by an Italian alchemist that his strength could be restored by bathing in the blood of infants, he had many children entrapped for this hideous purpose into his castle of Champtocé on the Loire, the ruins of which are still to be seen. At last the horrible suspicions of the country folk as to what was going on were brought to proof, and the monster was burnt at the stake at Nantes in 1440. In all this, however, there is not a word about murdered wives. Indeed the historical Blue Beard, in his character of murderous monster, seems to have inherited an older tale belonging to the wife-murderer of Breton legend, Comor the Cursed, Count of Poher, whose name and deeds are set down to near a thousand years earlier, in the legendary chronicles which tell of him as a usurper and tyrant who married and murdered one wife after another, till at last when he had wedded and killed the beautiful Trifine, vengeance overtook him, and he was defeated and slain by the rightful prince. It is not easy to say whether this is a version of a yet older story, or whether there is a historical foundation for it; if Henry VIII. of England had lived in those times, such a legend might have gathered round his name. Other points of the modern Blue Beard appear already in the story of Trifine, her sending for aid to her kinsmen when she knows her danger, and her discovery of the murder of the former wives. This last, however, does not come to pass in the modern way; in the legend, Trifine goes down into the chapel to pray in the hour of need, and there the tombs of the four murdered wives open and their corpses stand upright, each with the knife or cord or whatever she was murdered with in her hand. Instead of this powerful and ghastly scene, the modern version brings in the hackneyed episode of the forbidden chamber, which had long been the property of story-tellers for use on suitable occasions, and is to be found in the *Arabian Nights*. The old Trifine legend has a characteristic ending. Her wicked husband pursues her into the forest and cuts her head off, but St. Gildas makes her body carry it back to Comor's castle, which he overthrows by flinging a handful of dust at it, then he puts Trifine's head on for her again, and she retires into a convent for the rest of her life. The story-tellers of later times prefer a more cheerful if more commonplace finish.

The miracle-legend just quoted brings us back to the

historical use of myth, which was spoken of earlier in this chapter. The story of St. Gildas bringing the fair Trifine back to her castle with her head in her hand, and his afterwards putting it back on her shoulders, is history. It records the intellectual state of the age when it was held edifying to tell such wonders of holy men, for holy men were believed able to do them. Old tales which seem extravagant to our minds are apt thus to have historical value by pointing back to the times when, seeming possible, they were made. This is true even of Æsop's fables. In the stage of thought when human souls are thought able to live in animals' bodies, when a wolf may have one's enemy's soul in him, or one's grandfather may be crawling on the hearth in the body of a snake, stories of rational beasts themselves seem rational. Among the Buddhists, where beast-tales early became moral apologues, they are told as incidents of the many births or transmigrations of the great founder of the religion. It was Buddha himself who, as a bird, took the bone out of the lion's throat, and was repaid by being told that he was lucky to be so well out of it. It was Buddha who, born in the body of a peasant, listened to the ass in the lion's skin, and said he was but an ass. That millions of people should have this as part of their sacred literature is a fact of interest in the study of civilization, warning us not to cast aside a story as worthless, because it is mythical. For understanding the thoughts of old-world nations, their myths tell us much we should hardly learn from their history.

CHAPTER XVI

SOCIETY

Social Stages, 131—Family, 131—Morals of Lower Races, 134—Public Opinion and Custom, 136—Moral Progress, 137—Vengeance and Justice, 141—War, 144—Property, 145—Legal Ceremonies, 148—Family Power and Responsibility, 150—Patriarchal and Military Chiefs, 151—Nations, 154—Social Ranks, 156—Government, 157.

In the reports of crimes which appear daily in the newspapers of our civilized land, such phrases often occur as *savage* fury, *barbarous* cruelty. These two words have come to mean in common talk such behaviour as is most wild, rough, and cruel. Now no doubt the life of the less civilized people of the world, the *savages* and *barbarians*, is more wild, rough, and cruel than ours is on the whole, but the difference between us and them does not lie altogether in this. As the foregoing chapters have proved, savage and barbarous tribes often more or less fairly represent stages of culture through which our own ancestors passed long ago, and their customs and laws often explain to us, in ways we should otherwise have hardly guessed, the sense and reason of our own. It should be understood that it is out of the question to give here even a summary of the complicated systems of society : all that can be done is to put before the reader some of its leading principles in ancient and modern life.

Mankind can never have lived as a mere struggling crowd, each for himself. Society is always made up of families or households bound together by kindly ties, controlled by rules of marriage and the duties of parent and child. Yet the forms of these rules and duties have been very various. Marriages may be shifting and temporary pairing, or unions where the husband may have several wives, and the wife several husbands. It is often hard to understand the family group and its ties in the rude and ancient world. Thus it seems to us a matter of course to reckon family descent in the

male line, and this is now put in the clearest way by the son taking the father's surname. But in lower stages of civilization, on both sides of the globe, many tribes take the contrary idea as a matter of course. In most Australian tribes the children belong to the mother's clan, not the father's; so that in native wars father and son constantly meet as natural enemies. Chiefship often goes down in the royal mother's line, as among the Natchez, who had their sun-temples in what is now Louisiana. Yet this widespread law of female descent, deep as it lies in the history of society, had been so lost sight of among the ancient civilized nations, that when Herodotus noticed it among the Lykians, who took their names from their mothers and traced their pedigrees through the female branches only, the historian fancied this was a peculiar custom, in which they were unlike all other people. In the savage and barbaric world there prevails widely the rule called by McLennan exogamy or marrying-out, which forbids a man to take a wife of his own clan—an act which is considered criminal, and may even be punished with death. It is a strange contrast to the popular idea that savage life has no rules, when we find Australian tribes where every man is bound to marry into the particular clan which is, so to speak, the wife-clan to his own. Among the Iroquois of North America the children took the clan-name or totem of the mother; so if she were of the Bear clan, her son would be a Bear, and accordingly he might not marry a Bear girl, but might take a Deer or Heron. Such laws appear also among higher nations who reckon descent in the male line. Thus in India a Brahman is not to marry a wife whose clan-name (her "cow-stall," as they say) is the same as his; nor may a Chinese take a wife of his own surname. Though the family and tribe rules of the savage and barbaric world are too intricate to be fully discussed here, there are some instructive points to which attention should be called. Marriage is in early stages of society a civil contract. Thus, among the wild hunting-tribes of Nicaragua, the lad who wishes a girl for a wife kills a deer and lays it with a heap of firewood at the door of her parents' hut, which symbolic act is his offer to hunt and do man's work; if the gift is accepted, it is a marriage, without further ceremony. Among peoples of higher culture more formal promises and ceremonies come in, with feasts and gatherings of kinsfolk; and then, as in other important matters of

life, the priest is called in to give divine blessing and sanction to the union. Where this is done, a wedding has come to be very different from what it was in the rough times of marriage by capture, such as might be seen in our own day among fierce forest tribes in Brazil, where the warriors would make forays on distant villages and by main force bring home wives. Ancient tradition knows this practice well, as where the men of Benjamin carry off the daughters of Shiloh dancing at the feast, and in the famous Roman tale of the rape of the Sabines, a legend putting in historical form the wife-capture which in Roman custom remained as a ceremony. What most clearly shows what a recognised old-world custom it was, is its being thus kept up as a formality where milder manners really prevail. It had passed into this state among the Spartans, when Plutarch says that, though the marriage was really by friendly settlement between the families, the bridegroom's friends went through the pretence of carrying off the bride by violence. Within a few generations the same old habit was kept up in Wales, where the bridegroom and his friends, mounted and armed as for war, carried off the bride; and in Ireland they used even to hurl spears at the bride's people, though at such a distance that no one was hurt, except now and then by accident, as happened when one Lord Hoath lost an eye, which mischance seems to have put an end to this curious relic of antiquity. It was one of the consequences of increase of property in the world that the practice of buying wives came in, as where a Zulu bargains with a girl's people to let him have her perhaps for five oxen or ten. This was the custom in England among our barbaric forefathers, as appears in the West-Saxon law of Ine—"If a man buy a wife," &c. Cnut somewhat later forbade the wife to be sold, but the husband might give something of his own will. It is an interesting problem in the history of law how the money once paid as the bride's price passed into a gift or dower for her; some provision of this kind became necessary when the widow was no longer provided for by being taken, as she would have been in a ruder state of society, as a wife by her husband's brother.

Marriage has been here spoken of first, because upon it depends the family, on which the whole framework of society is founded. What has been said of the ruder kinds of family union among savages and barbarians shows that there cannot be expected from them the

excellence of those well-ordered households to which civilized society owes so much of its goodness and prosperity. Yet even among the rudest clans of men, unless depraved by vice or misery and falling to pieces, a standard of family morals is known and lived by. Their habits, judged by our notions, are hard and coarse, yet the family tie of sympathy and common interest is already formed, and the foundations of moral duty already laid, in the mother's patient tenderness, the father's desperate valour in defence of home, their daily care for the little ones, the affection of brothers and sisters, and the mutual forbearance, helpfulness, and trust of all. From the family this extends to a wider circle. The natural way in which a tribe is formed is from a family or group, which in time increases and divides into many households, still recognising one another as kindred, and this kinship is so thoroughly felt to be the tie of the whole tribe, that, even when there has been a mixture of tribes, a common ancestor is often invented to make an imaginary bond of union. Thus *kindred* and *kindness* go together—two words whose common derivation expresses in the happiest way one of the main principles of social life.

Among the lessons to be learnt from the life of rude tribes is how society can go on without the policeman to keep order. It is plain that even the lowest men cannot live quite by what the Germans call "faust-recht," or "fist-right," and we call "club-law." The strong savage does not rush into his weaker neighbour's hut and take possession, driving the owner out into the forest with a stone-headed javelin sent flying after him. Without some control beyond the mere right of the stronger, the tribe would break up in a week, whereas in fact savage tribes last on for ages. Under favourable circumstances, where food is not too scarce nor war too wasting, the life of low barbaric races may be in its rude way good and happy. In the West Indian islands where Columbus first landed lived tribes who have been called the most gentle and benevolent of the human race. Schomburgk, the traveller, who knew the war-like Caribs well in their home life, draws a paradise-like picture of their ways, where they have not been corrupted by the vices of the white men; he saw among them peace and cheerfulness and simple family affection, un-varnished friendship, and gratitude not less true for not being spoken in sounding words; the civilized world, he

says, has not to teach them morality, for though they do not talk about it, they live in it. At the other side of the world in New Guinea, Kops, the Dutch explorer, gives much the same account of the Papuans of Dory, who live in houses built on piles in the water, like the old lake-men of Switzerland; he speaks of their mild disposition, their inclination to right and justice, their strong moral principles, their respect for the aged and love for their children, their living without fastenings to their houses—for theft is considered by them a grave offence, and rarely occurs. Among the rude non-Hindu tribes of India, English officials have often recorded with wonder the kindliness and cheerfulness of the rude men of the mountains and the jungle, and their utter honesty in word and deed. Thus Sir Walter Elliot mentions a low poor tribe of South India, whom the farmers employ to guard their fields, well knowing that they would starve rather than steal the grain in their charge; and they are so truthful that their word is taken at once in disputes even with their richer neighbours, for people say "a Kurubar always speaks the truth." Of course these accounts of Caribs and Papuans show them on the friendly side, while those who have fought with them call them monsters of ferocity and treachery. But cruelty and cunning in war seem to them right and praiseworthy; and what we are here looking at is their home peace-life. It is clear that low barbarians may live among themselves under a fairly high moral standard, and this is the more instructive because it shows what may be called natural morality. Among them religion, mostly concerned with propitiating souls of ancestors and spirits of nature, has not the strong moral influence it exerts among higher nations; indeed their behaviour to their fellows is little affected by divine command or fear of divine punishment. It has more to do with their life being prosperous or miserable. When want or the miseries of war upset their well-being, they (like their betters) become more brutal and selfish in their ways, and moral habits are at all times low among the comfortless hordes of savages whose daily struggle for existence is too harsh for the gentler feelings to thrive. Moreover, there is this plain difference between low and high races of men, that the dull-minded barbarian has not power of thought enough to come up to the civilized man's best moral standard. The wild man of the forest, forgetful of yesterday and careless of to-morrow, lolling

in his hammock when his wants are satisfied, has little of the play of memory and foresight which is ever unrolling before our minds the panorama of our own past and future life, and even sets us in thought in the places of our fellows, to partake of their lives and enter into their joys and sorrows. Much of the wrong-doing of the world comes from want of imagination. If the drunkard could see before him the misery of next year with something of the vividness of the present craving, it would overbalance it. Ofttimes in the hottest fury of anger, the sword has been sheathed by him across whose mind has flashed the prophetic picture of the women weeping round the blood-stained corpse. The lower races of men are so wanting in foresight to resist passion and temptation that the moral balance of a tribe easily goes wrong, while they are rough and wantonly cruel through want of intelligent sympathy with the sufferings of others, much as children are cruel to animals through not being able to imagine what the creatures feel. What we now know of savage life will prevent our falling into the fancies of the philosophers of the last century, who set up the "noble savage" as an actual model of virtue to be imitated by civilized nations. But the reality is quite as instructive, that the laws of virtue and happiness may be found at work in simple forms among tribes who make hatchets of sharpened stones and rub sticks together to kindle fire. Their life, seen at its best, shows with unusual clearness the great principle of moral science, that morality and happiness belong together—in fact that morality is the method of happiness.

It must not be supposed that in any state of civilization a man's conduct depends altogether on his own moral sense of right and wrong. Controlling forces of society are at work even among savages, only in more rudimentary ways than among ourselves. Public opinion is already a great power, and the way in which it acts is particularly to be noticed. Whereas the individual man is too apt to look to his own personal interest and the benefit of his near friends, these private motives fall away when many minds come together, and public opinion with a larger selfishness takes up the public good, encouraging the individual to set aside his private wishes and give up his property or even his life for the commonwealth. The assembled tribe can crush the mean and cowardly with their scorn, or give that reward of glory for which the high-spirited will risk goods and

life. Travellers have remarked that the women, however down-trodden, know how to make their influence felt in this way, and many a warrior whose heart was failing him in face of the enemy has turned from flight when he thought of the girls' mockery when he should slink home to the village, safe but disgraced. This pressure of public opinion compels men to act according to custom, which gives the rule as to what is to be done or not done in most affairs of life. Explorers of wild countries, not finding the machinery of police they are accustomed to at home, have sometimes rashly concluded that the savages lived unrestrained at their own free will. We have here already noticed that this is a mistake, for life in the uncivilized world is fettered at every turn by chains of custom. To a great extent it is evident that customs have come into existence for the benefit of society, or what was considered so. For instance, it is generally held right in wild countries that hospitality shall be freely given to all comers, for everyone knows he may want it any day himself. But whether a custom is plainly useful or not, and even when its purpose is no longer known, once established as a custom it must be conformed to. Savages may have finger-joints cut off, or undergo such long and severe fasts that many die; but often the only reason they can give for inflicting such suffering on themselves is that it was the custom of their ancestors. In some parts of Australia custom forbade to the young hunters, and reserved for the old men, much of the wild fowl and the best joints of the large game. No doubt this was in some measure for the public benefit, as the experienced elders, who were past the fatigue of hunting, were able to stay in camp, make nets and weapons, teach the lads, and be the repositories of wisdom and the honoured counsellors of the tribe. Nothing could prove more plainly how far society is, even among such wild men of the desert, from being under the mere sway of brute force.

Thus communities, however ancient and rude, always have their rules of right and wrong. But as to what acts have been held right and wrong, the student of history must avoid that error which the proverb calls measuring other people's corn by one's own bushel. Not judging the customs of nations at other stages of culture by his own modern standard, he has to bring his knowledge to the help of his imagination, so as to see institutions where they belong and as they work. Only thus

can it be made clear that the rules of good and bad, right and wrong, are not fixed alike for all men at all times. For an example of this principle, let us observe how people at different stages of civilization deal with the aged. Some of the lower races take much care of their old folks even after they are fallen into imbecility, treating them with almost gentle considerateness and very commonly tending them till death, when respect to the living ancestor passes into his worship as an ancestral spirit. But among other tribes filial kindness breaks down earlier, as among those fierce Brazilians who knock on the head with clubs the sick and aged, and even eat them, whether they find their care too burdensome, or whether they really think, as they say, that it is kind to end a life no longer gladdened with fight and feast and dance. We realize the situation among roving tribes. The horde must move in quest of game, the poor failing creature cannot keep up in the march, the hunters and the heavily laden women cannot carry him; he must be left behind. Many a traveller has beheld in the desert such heartrending scenes as Catlin saw when he said farewell to the white-haired old Puncah chief, all but blind and shrunk to skin and bone, crouched shivering by a few burning sticks, for his shelter a buffalo-hide set up on crutches, for his food a dish of water and a few half-picked bones. This old warrior was abandoned at his own wish when his tribe started for new hunting-grounds, even as years before, he said, he had left his own father to die when he was no longer good for anything. When a nation settled in the agricultural state has reached something of wealth and comfort, there is no longer the excuse of necessity for killing or abandoning the aged. Yet history shows how long the practice was kept up even in Europe, partly with the humane intent of putting an end to lingering misery, but more through the survival of a custom inherited from harder and ruder times. The Wends in what is now Germany practised the hideous rite of putting the aged and infirm to death, cooking and eating them, much as Herodotus describes the old Massagetæ as doing. In Sweden there used to be kept in the churches certain clumsy wooden clubs, called "family-clubs," of which some are still preserved, and with which in ancient times the aged and hopelessly sick were solemnly put to death by their kinsfolk. It is interesting to trace in the old German records the change from such hard ancient

barbarism to gentler manners, when the infirm old house-father, dividing his substance among his children, is to sit henceforth well cared for in the "cat's place" by the hearth. One of the marks of advancing civilization was the growing sense of the sacredness of human life, even apart from its use and pleasure, and under this feeling the cutting short of even a burdensome and suffering existence, which our ancestors resorted to without reproach, has come to be looked upon with horror.

It must be clearly understood also that the old-world rules of moral conduct were not the same towards all men. A man knew his duty to his neighbour, but all men were not his neighbours. This is very clearly seen in the history of men's ideas of manslaughter and theft. The slaying of a man is scarcely held by the law of any people to be of itself a crime, but on the contrary it has been regarded as an allowable or praiseworthy act under certain conditions, especially in self-defence, war, revenge, punishment, and sacrifice. Yet no known tribe, however low and ferocious, has ever held that men may kill one another indiscriminately, for even the savage society of the desert or the jungle would collapse under such lawlessness. Thus all men acknowledge some law "thou shalt not kill," but the question is how this law applies. It is instructive to see how it works among those fierce tribes who approve the killing of men simply as a proof of valour. Thus the young Sioux Indian, till he had killed his man, was not allowed to stick the feather in his head-dress and have the title of brave or warrior; he could scarcely get a girl to marry him till he had "got the feather." So the young Dayak of Borneo could not get a wife till he had taken a head, and it was thus with the skull or scalp which the Naga warrior of Asam had to bring home, thereby qualifying himself to be tattooed and to marry a wife, who had perhaps been waiting years for this ugly marriage-licence. The trophy need not have been taken from an enemy, and might have been got by the blackest treachery, provided only that the victim were not of the slayer's own tribe. Yet these Sioux among themselves hold manslaughter to be a crime unless in blood-revenge; and the Dayaks punish murder. This state of things is not really contradictory; in fact its explanation lies in the one word "tribe." The tribe makes its law, not on an abstract principle that manslaughter is right or wrong,

but for its own preservation. Their existence depends on holding their own in deadly strife with neighbouring tribes, and thus they put a social premium on the warrior's proof of valour in fight against the enemy, though in these degenerate days they allow the form to be meanly fulfilled by bringing in as a warrior's trophy the head of some old woman or wretched waylaid stranger. In this simple contrast between one's own people and strangers, the student will find a clue to the thought of right and wrong running through ancient history, and slowly passing into a larger and nobler view. The old state of things is well illustrated in the Latin word *hostis*, which, meaning originally stranger, passed quite naturally into the sense of enemy. Not only is slaying an enemy in open war looked on as righteous, but ancient law goes on the doctrine that slaying one's own tribesman and slaying a foreigner are crimes of quite different order, while killing a slave is but a destruction of property. Nor even now does the colonist practically admit that killing a brown or black man is an act of quite the same nature as killing a white countryman. Yet the idea of the sacredness of human life is ever spreading more widely in the world, as a principle applying to mankind at large.

The history of the notion of theft and plunder follows partly the same lines. In the lower civilization the law, "thou shalt not steal," is not unknown, but it applies to tribesmen and friends, not to strangers and enemies. Among the Ahts of British Columbia, Sproat remarks that an article placed in an Indian's charge on his good faith is perfectly safe, yet thieving is a common vice where the property of other tribes or of white men is concerned. But, he says, it would be unfair to regard thieving among these savages as culpable in the same degree as among ourselves, for they have no moral or social law forbidding thieving between tribe and tribe, which has been commonly practised for generations. Thus, although the Africans within their own tribe-limits have strict rules of property, travellers describe how a Zulu war-party, who have stealthily crept upon a distant village and massacred men, women, and children, will leave behind them the ransacked kraal flaring on the horizon and return with exulting hearts and loads of plunder. The old-world law of a warlike people is well seen among the ancient Germans in Cæsar's famous sentence, "Robberies beyond the bounds of

each community have no infamy, but are commended as a means of exercising youth and diminishing sloth." Even in the midst of modern civilization, a declaration of war may still carry society back to the earlier stages of plunder and prize-money. But in peace the safety of property as well as life is becoming more settled in the world. The extradition treaties by which criminals, deprived of their old refuge over the border, are now given up to justice in the country where they offended, mark the modern tendency to unite nations in one community, which recognises among all its members mutual right and duty.

Hitherto we have been looking at right and wrong chiefly as worked by men's own moral feelings and by public opinion. But stronger means have at all times been necessary. It is now reckoned one of the regular duties of civilization to have a criminal law to punish wrong-doers with fine, imprisonment, blows, and even death. This system, however, only gradually arose in the world, and history can show plain traces of how it grew up from the early state of things when there were as yet no professional judges or executioners, but it was every man's right and duty to take the law into his own hands, and that law was what we now call vengeance. When in barbaric life fierce passion breaks loose and a man is slain, this rule of vengeance comes into action. How it works as one of the great forces of society may well be seen among the Australians. As Sir George Grey says in his account of it, the holiest duty a native is called on to perform is to avenge the death of his nearest relation. If he left this duty unfulfilled, the old women would taunt him; if he were unmarried, no girl would speak to him; if he had wives, they would leave him; his mother would cry and lament that she had given birth to so degenerate a son, his father would treat him with contempt, and he would be a mark for public scorn. But what is to be done if the murderer escapes, as must in so wild and thinly peopled a country be easy? Native custom goes on the ancient doctrine that the criminal's whole family are responsible; so that when it is known that a man has been slain, and especially when the actual culprit has escaped, his kinsfolk run for their lives; the very children of seven years old know whether they are of kin to the manslayer, and, if so, they are off at once into hiding. Here then we come in view of two principles which every student of law should

have clearly in his mind in tracing its history up from its lowest stages. In the primitive law of vengeance of blood, he sees society using for the public benefit the instinct of revenge which man has in common with the lower animals; and by holding the whole family answerable for the deed of one of its members, the public brings the full pressure of family influence to bear on each individual as a means of keeping the peace. No one who sees the working of blood-vengeance can deny its practical reasonableness, and its use in restraining men from violence while there are as yet no judges and executioners. Indeed among all savages and barbarians the avenger of blood, little as he thinks it himself in his wild fury, is doing his part toward saving his people from perishing by deeds of blood. Unhappily his usefulness is often marred through ignorance and delusion turning his vengeance against the innocent. These Australians are among the many savages who do not see why anybody should ever die unless he is killed, so they account for what we call natural death by settling it that some enemy killed the sufferer by magic art, wounding him with an invisible weapon, or sending a disease-demon to gnaw his vitals. Therefore, when a man dies, his kinsmen set themselves to find out by divination what malignant sorcerer did him to death, and when they have fixed on some one as the secret enemy the avenger sets out to find and slay him; then of course there is retaliation from the other side, and an hereditary feud sets in. This is one great cause of the rancorous hatred between neighbouring tribes which keeps savages in ceaseless fear and trouble.

Passing to higher levels of civilization, among the nations of the ancient world we still find the law of blood-vengeance, but it is being gradually modified by the civilization which in time ousts it altogether. Thus the law of the Israelites, while still authorizing the avenger of blood, provides that there shall be cities of refuge, and that the morally innocent manslayer shall not be as the wilful murderer. Among nations where wealth has been gathered together, and especially where it has come to be measured by money, the old fierce cry for vengeance sinks into a claim for compensation. In Arabia to this day the earlier and later stages may be seen side by side; while the roaming Beduin tribes of the desert carry on blood-feuds from generation to generation with savage ferocity, the townsfolk feel that

life can hardly go on with an assassin round every street-corner, so they take the blood-money and loose the feud. This state of things is instructive as being like that of our own early ancestors when the Teutonic law was still that a man took vengeance for hurt done to him or his, unless he compounded it. The Anglo-Saxon word for such composition was *wér-gild*, probably meaning "man-money," 200 shillings for a free man, less for lower folk, and less for a Welshman than an Englishman. Again, where the rule of vengeance is a life for a life, lesser hurts are also repaid in kind, which is the Roman *lex talionis*, or "law of the like"—*retaliation*. This is plainly set forth in the Jewish law, life for life, eye for eye, tooth for tooth, wound for wound, stripe for stripe. It is still law in Abyssinia, where not long since a mother prosecuted a lad who had accidentally fallen from a fruit-tree on her little son and killed him; the judges decided that she had a right to send another son up into the tree to drop on the boy who had unintentionally caused the first one's death, which remedy however she did not care to avail herself of. Of course retaliation came to be commuted into money, as when old English laws provide that, if any one happen to cut off the fist or foot of a person, let him render to him the half of a man's price, for a thumb half the price of a hand, and so on down to 5*s*. for a little finger and 4*d*. for a little-finger nail. In the times we live in, justice has passed into a higher stage, where the State takes the duty of punishing any serious wilful hurt done to its citizens. Reading some murderous tale of a Corsican "vendetta," we hardly stop to think of it as a relic of ancient law lingering in a wild mountain island. Yet our criminal law grew out of such private vengeance, as is still plain to those who attend to traces of the past, when they hear such phrases as "the vengeance of the law," or think what is meant by the legal form by which a private person is bound over to prosecute, as though he must still be suing, as he would have done in long-past ages, for his own revenge or compensation. It is now really the State that is seeking to punish the criminal for the ends of public justice. The avenger of blood, once the guardian of public safety, would now be himself punished as a criminal for taking the law into his own hands, while the moralists, now that the conditions of society are changed, lay it down that vengeance is sinful.

Law, however, though it has so beneficially taken the

place of private vengeance, has not fully extended its sway over the larger quarrels between State and State. The relation of private vengeance to public war is well seen among rude tribes, such as inhabit the forests of Brazil. When a murder is done within the tribe, then of course vengeance lies between the two families concerned; but if the murderer is of another clan or tribe, then it becomes a public wrong. The injured community hold council, and mostly decide for war if they dare; then a war-party sets forth, in which the near kinsmen of the murdered man, their bodies painted with black daubs to show their deadly office, rush foremost into the fight. Among neighbouring tribes the ordinary way in which war begins is by some quarrel or trespass, then a man is killed on one side or the other, and the vengeance for his death spreads into blood-feud and tribal war ever ready to break out from generation to generation. This barbaric state of things lasted far on into the history of Europe. It was old German law that any freeman who had been injured in body, honour, or estate might, with the help of his own people, avenge himself if he would not take the legal commutation; that is to say, he had the right of private war. It was a turning-point in English history when King Edmund made a law to restrain this "unrighteous fighting," but it was not stopped at once, especially in Northumberland, and we know how it went on into modern times between clan and clan in the wild Scotch Highlands. Long after the mere freeman ceased to go to war with his neighbours, there were nobles who stood to their old right. As late as the time of Edward IV. Lord Berkeley and his followers fought a battle with Lord Lisle at Nibley Green in Gloucestershire. Lord Lisle was slain, and in the end Lord Berkeley compounded by a money payment to the widow. Freeman, who in his *Comparative Politics* mentions this curious incident of fifteenth-century history, thinks it the last English example either of private war or the payment of the wér-gild. The law of England which forbids the levying of private war represents one of the greatest steps in national progress. The State now replaces, by the justice of legal tribunals, the barbaric expedients of private vengeance and private war. But State and State still fight out their quarrels in public war, which then becomes on a larger scale much what deadly feud used to be between clan and clan.

The civil law of property may, like the criminal law, be traced from the ideas of old times. A fair notion may be had of what early rules of property were like, by noticing what they are in the uncivilised world still. Among the lower races, the distinction which our lawyers make between real and personal property appears in a very intelligible way. Of the land all have the use, but no man can be its absolute owner. The simplest land-law, which is also a game-law, is found among tribes who live chiefly by hunting and fishing. Thus in Brazil each tribe had its boundaries marked by rocks, trees, streams, or even artificial landmarks, and trespass in pursuit of game was held so serious that the offender might be slain on the spot. At this stage of society in any part of the world, every man has the right to hunt within the bounds of his own tribe, and the game only becomes private property when struck. Thus there is a distinct legal idea of common property in land belonging to the clan or tribe. There is also a clear idea of family property: the hut belongs to the family or group of families who built it; and when they fenced in and tilled the plot of ground hard by, this also ceased to be common land, and became the property of the families, at least while they occupied it. To each family belonged also the hut-furniture, such as hammocks, mealing-stones, and earthen pots. At the same time personal ownership appears, though still under the power of the family, through the father or head. Personal or individual property was chiefly what each wore or carried—the man's weapons, the ornaments and scanty clothing of both sexes, things which they had some power to do as they liked with during life, and at death very commonly took away with them to the world beyond the grave (see p. 90). Here then we find barbarians already acquainted with the ideas of common land, family freehold, family and personal property in movables, which run through the systems of old-world law. Not that they are worked out in the same way everywhere. Thus in the village communities which had so great a part in settling Asia and Europe, and whose traces still remain in modern England, not only the hunting-grounds and meadows were held in common, but the families did not even own the ploughed fields, which were tilled by common labour or re-allotted from time to time among the households, so that the family freehold did not reach beyond its house and garden-plot.

At various times in history, the rise of military nations revolutionised the earlier ways of land-holding. In invaded countries, lands of the conquered were distributed by the king or leader to be held by his captains or soldiers doing military service in return; the greatest and best-known example is the feudal system of Europe in the Middle Ages. It is instructive to notice how in England, before the Norman Conquest, the folk-land, the common property of the state, was already passing into the hands of the king to grant at his pleasure. Or in a military state the sovereign may become the universal landlord, allowing his subjects to hold lands on payment of an annual tribute or tax—a system well known in ancient Egypt and modern India. In Roman history we find the state or families owning large lands letting portions of them as farms to tenants who paid part of the produce in return. This shows the beginning of rent, a thing unknown to primitive law. While these changes were coming on as to the land, movable property was becoming more and more important. War-captives kept as slaves to till the soil became part of the wealth of the family, and the pastoral life brought in cattle, not only for food, but to plough the fields. The manufacture of valuable goods, the growth of commerce, the accumulation of treasure, and the use of money, added other possessions. If now we look at our modern ways of dealing with property, it is seen what great changes we have made by taking it out of the hands of the family and allowing an individual owner to hold and dispose of it—an arrangement suited to our age of shifting trading enterprise. Even land is bought and sold by individuals, though the law, by making a field and cottage transferable by a different process and with greater formality and cost than a diamond necklace or a hundred chests of tea, keeps up traces of the old system under which it could only have changed hands, if at all, with difficulty and by the consent of many parties. Through all changes it is instructive to notice how far the old family system of property holds its place. This is well seen by considering what becomes of a man's property when he dies. The two most usual arrangements made in early times are the simplest, namely, either that the family shall go on living on the undivided property, or that it shall be divided among the children, or sons. When the eldest son is patriarchal head of the family, to keep up this dignity he may have an extra or double portion for

his "birth-right"; this is a well-known ancient rule, common to the Aryan and Semitic nations, for it is both in the Hindu laws of Manu and in Deuteronomy. In France at this day the ancient principle of division is legally enforced, and the family take their shares as a matter of right. In England the power of wills has become so great that in theory a man may leave his property to whom he pleases; but practically this is kept within bounds by moral feeling and public opinion, which condemn it as an unnatural act for a man to strip his own children to endow a stranger or a hospital. If the Englishman dies without leaving a will, the law recognises the rights of his family by fairly dividing among them his personal property. It is otherwise with the land or real estate, which in most cases will pass to the eldest son. Why the law should thus allow the claims of the rest of the family to the money, but not to the land, is an interesting point of history. The reader of Maine's *Ancient Law* will find how, in Europe about a thousand years ago, lands held as fiefs came to pass to the eldest son, not by any means for the purpose of enriching him by disinheriting the others, but that the united kinsfolk might live upon the land and defend it under him as chief of the little clan. If in modern times the head of the family has become possessed of the family estate for his own use, this is because old laws working under new circumstances are apt to produce results which those who framed them never foresaw. Primogeniture did not prevail over the whole of England, but older rules of family inheritance have in some parts lasted on from times before feudalism. The best known of these is where at the father's death the land is divided among the sons, as Domesday Book shows was usual in Edward the Confessor's time. This is now known as gavelkind, or the custom of Kent, but it appears elsewhere; for instance, Kentish Town in the north of London is supposed to have its name from lands so held there. There even exists in England a rule of inheritance which seems to belong to a yet earlier state of society. This is the custom of borough-english, by which, for instance at Hackney or Edmonton, if a man die intestate the land passes to his youngest son. This right of the youngest, strange as it seems to us, is still found here and there in Europe and Asia. It is a reasonable law of inheritance of the settlers in a new country, where there is yet plenty of land to be had for the taking, and the

sons as they grow up and marry go out and found new homesteads of their own. But the youngest stays at home and takes care of the old father and mother; he is, as the Mongols say, the "fire-keeper," and at their death he naturally succeeds to the family home. This is one of the hundreds of cases of customs which seem arbitrary and unreasonable, because they have lost their sense by lasting on from the state of life to which they properly belonged.

In the old days before there were lawyers and law books, solemn acts and rights were made plain to all men by picturesque ceremonies suited to lay hold of unlettered minds. Many of these old ceremonies are still kept up and show their meaning as plainly as ever. For example, when two parties wish to make firm peace or friendship, they will go through the ceremony of mixing their blood, so as to make themselves blood-relations. Travellers often now ally themselves in such blood-brotherhood with barbarous tribes; an account of East Africans performing the rite describes the two sitting together on a hide so as to become "of one skin," and then they made little cuts in one another's breasts, tasted the mixed blood, and rubbed it into one another's wounds. Thus we find still going on in the world a compact which Herodotus describes among the ancient Lydians and Skythians, and which is also mentioned in the Sagas of the old Northmen and the ancient Irish legends. It would be impossible to put more clearly the great principle of old-world morals, that a man owes friendship not to mankind at large but only to his own kin, so that to entitle a stranger to kindness and good faith he must become a kinsman by blood. With much the same thought even rude tribes hold that eating and drinking together is a covenant of friendship, for the guest becomes in some sort one of the household, and has to be treated as morally one of the family. This helps to explain the vast importance people everywhere give to the act of dining together. Among the millions of India at this day the very constitution of society turns on the caste rules whom a man may or may not eat with. Among the marriage ceremonies of the world, one well known in the Far East is that the couple by eating together out of one dish become man and wife. How ceremony expresses meaning in still more striking metaphor is seen in the Hindu marriage, where the skirts of the bridegroom and bride's garments are tied together as

a sign of union, and the bride steps on a stone to show she will be as firm as stone. A custom is described among English vagrants of the last century, where a man and woman would join hands across the body of a dead beast, thus promising that they would be joined till death should part them. Among the dramatic ceremonies known to European law is the scene in an ancient Roman law-court, where a man put in his claim to a slave by stepping forward and touching him with a rod which represented a spear; or when in old Germany a piece of land was transferred by the owner handing over a sod of the turf with a green twig stuck up in it; or when in feudal times the vassal placed his hands between the lord's, and so "putting himself in his hands" became his man.

There were ceremonies in old-world law which were more than such gesture-language. Barbaric law early began to call on magical and divine powers to help in the difficult tasks of discovering the guilty, getting the truth out of witnesses, and making a promise binding. This led to the widespread system of ordeals and oaths. Some ordeals have really served to discover truth by their effect on the conscience of the evil-doer. It is thus with the mouthful of rice taken by all of a suspected household in India, which the thief's nervous fear often prevents him from swallowing. This used to be done in England with the corsnæd or trial-slice of consecrated bread or cheese; even now peasants have not forgotten the old formula, "May this bit choke me if I lie!" Another of the few ordeals that linger in popular memory may be seen when, in some out-of-the-way farm-house, all suspected of a theft are made to hold a bible hanging to a key, which is to turn in the hands of the thief; this keeps up a form of divination practised in the classic world with a sieve hanging by the points of an open pair of shears. Ordeals have had their day, and are now discarded from the laws of the most civilised nations. Nowadays one has to go to such countries as Arabia to find the ordeal by hot iron recognised by law, as it was in England in the days when the legend was told of Queen Emma walking over the red-hot ploughshares; the conjurors now go through this ancient performance as a circus-show. Yet even of late years, English rustics have been known to duck some wretched old woman supposed to be a witch, little knowing that they were keeping up the ancient water-ordeal, where the sacred element rejects the wrong and

accepts the right, so that the guilty floats and the innocent sinks—a judicial rite which forms part of the old Hindu law-book of Manu, and which in English law, till the beginning of the 13th century, was a legal means of trying those accused of murder and robbery. Ordeals by which the taker brings down present harm on himself if he is guilty are of much the same nature as oaths. It is usual, however, for oaths to call down future punishment, in this life or after death, as when, in Russian law-courts in Siberia, the curious spectacle may be seen of bringing in a bear's head that an Ostyak may bite at it, thereby calling on a bear to bite him if he is forsworn. The legal oaths in our own country bear in their gestures the traces of high antiquity. In Scotland the witness holds up his hand toward heaven, the gesture by which Greek and Jew took the supreme Deity to witness, and called down divine vengeance on the perjurer. In England the kissing of the book comes from the practice of touching a halidome, or sacred object, as an ancient Roman touched the altar, or Harold the casket of relics. The form "So help me God," is inherited from ancient Teutonic-Scandinavian law, under which the old Northman, touching the blood-daubed ring on the altar, swore "So help me Frey, and Niordh, and the almighty god" (that is, Thor). The first and last of these are the two old English gods whose names we keep up in *Friday* and *Thursday*.

To come now to the last subject of this volume, the history of government. Complicated as are the political arrangements of civilised nations, their study is made easier by their simple forms being already found in savage and barbaric life. The foundation of society, as has been already seen, is the self-government of each family. Its authority is apt to be vested in the head of the household; thus among low barbaric tribes in the Brazilian forests, the father may do as he pleases with his own wives and children, even selling them for slaves, and the neighbours have no right or wish to interfere. Even what civilised nations now take as a matter of course, that every human being coming into the world has a right to live, is scarcely recognised by the lower races. In such a life of hardship as the Australians and many savages lead, new-born children are often put out of the way from sheer need, because the parents have already as many mouths as they can feed. That among such tribes this comes of hardness of life, rather than hardness of

heart, is often seen when the parents will go through fire and water to save the very child they were doubting about, a few weeks before, whether it should live or die. Even where the struggle for existence is not so severe, the wretched custom of infanticide remains still common in the world. Nothing more clearly shows that European nations came up from a barbaric stage than the law which the ancient Romans had in common with our Teutonic ancestors, that it was for the father of the family to say whether the new-born child should be brought up or exposed. Once become a member of the household, the child has a firmer assurance of life; and when the young barbarian grows up to be a warrior, and becomes himself the head of a new household, he is usually a free man. But the oldest Roman law shows the head of the family ruling with a strictness hardly imaginable to our modern minds, for the father might chastise or put to death his grown-up sons, give them in marriage or divorce them, and even sell them. With the advance of civilization, in Rome as elsewhere, the sons gradually gained their rights of persons and property; and in comparing old-world life with our own, it is plainly seen how Christianity, looking not to family rights but to individual souls, tended toward personal freedom. With all the growth of individual freedom in modern life, the best features of family despotism remain in force; it is under parental authority that children are trained for their future duties, and the law is careful how it gives the child personal rights against the parent, lest it should weaken the very cement which binds society together. As, however, the family ceased to be so perfect a little kingdom within itself, the individual became responsible for his own doings. We have seen how, in rude society, when a crime is committed, the family of the aggrieved take vengeance on the culprit's family. Modern ideas of justice may teach us that this is wrong, that it is punishing the innocent for the guilty. But in the lower barbaric life it is practically the best way to keep order, and, to those who live under it, it seems right and natural, as where, among the Australians, when one of a family has done a murder the others take it as a matter of course that they are guilty too. Far from this idea being confined to savages, the student becomes familiar with it in the law of ancient nations, such as Greece and Rome. Here it will be enough to quote the remarkable passage from the Hebrew law which at once records what the old

principle was, and reforms it by bringing in the ideas of higher jurisprudence:—"The fathers shall not be put to death for the children, neither shall the children be put to death for the fathers: every man shall be put to death for his own sin." (Deut. xxiv. 16.)

Wherever the traveller in wild regions meets a few families roaming together over the desert, or comes upon a cluster of huts by a stream in the tropical forest, he may find, if he looks closely enough, some rudiments of government; for there is business which concerns the whole little community, such as a camping-ground to be chosen, or a fishery quarrel to be settled with the next tribe down the river. Even among the Greenlanders, as little governed a people as almost any in the world, it was noticed that, when several families lived together all the winter, one weather-wise old fisherman would have the north end of the snow-house for his place and be appointed to look after the inmates, taking care about their keeping the snow walls in repair, and going out and coming in together so as not to waste heat; also when they went out in hunting parties an experienced path-finder would be chosen as leader. It is common to find among rude tribes such a headman or chief, chosen as the most important or shrewdest; but he has little or no actual authority over the families, and gets his way by persuasion and public opinion. Naturally such a head-man's family is of consequence already, or, if not, he makes them so, and thus there is a tendency for his office to become hereditary. In tribes formed under the rule of female kinship, where the chief's own son may be out of the succession, the new chosen chief will probably be a younger brother or a nephew on the mother's side. Under the rule of succession on the father's side, which is so much more familiar to us, the very growth of the family brings on a patriarchal government. Suppose a single household to move out into the wilds and found a new settlement, it begins under the rule of the father, who, as new huts are built round the first home, remains head of the growing clan; but as old age comes on, his eldest son more and more acts in his name, and at his death will be recognised as succeeding him in the head-ship of the community. Here then is seen the rise of the hereditary chief or patriarch of the tribe, first in rank as representing the ancestor, and with more or less of real authority. But here also there is a practical power of setting the successor aside if he is too timid or wilful or

dull, when perhaps his uncle or brother will be put in his place, though the line of succession is not set aside by this. The patriarchal system extends far on in civilization. It is not confined to one particular race or nation, but may at this day be studied alike among the brown hill-men of India and the negroes of West Africa. To us it is especially well known from the Old Testament, which shows it in the form it takes in a pastoral nation, and which still may be seen with little change among the Arabs of the desert, whose clans and tribes are governed by their patriarchs, the sheykhs or old men. Not less does it lie at the foundation of the politics of the Aryan race, where its remains may still be traced in the village communities of India and Russia, the village elder presiding in the council of "white-heads" being the modern representative of the earlier patriarch with the chiefs of younger branches of the clan around him. Under such mild rule, people of few wants may prosper in time of peace, in the kindly communism which is possible where there are no rich and no poor. The weak point of such a society is that it can hardly advance, for civilization is at a standstill where it is regulated by ancestral custom administered by great-grandfathers. Everywhere in the world, in war some stronger and more intelligent rule than this is needed and found. The changes which have shaped the descendants of wild hordes into civilized nations have been in great measure the work of the war-chief.

When among such uncultured tribes war breaks out, the peace-chief is pushed aside and a leader chosen, or in war-like tribes the war-chief may be the acting head at all times. Of course he is a tried warrior, and his endurance may even be put to a special examination, as when the Caribs would test a candidate for war-chief by mercilessly flogging and scratching him, smoking him in a hammock over a fire of green leaves, or burying him up to the middle in a nest of stinging-ants. We even find in America the principle of competitive examination for king, when Chilian tribes would choose as their chief the man who could lift the biggest tree on his shoulder and carry it longest. In these rude countries the change is wonderful when war turns the loose crowd into an army under a leader, with powers of life and death to enforce discipline. When Martius the naturalist was travelling through a Brazilian forest with a Miranha chief, they came to a fig-tree where the skeleton of a man was bound

to the trunk with cords of creepers, and the chief grimly explained that this was one of his men who had disobeyed orders by not summoning a neighbouring tribe to help against the invading Umauas, and he had him tied up there and shot to death with arrows. In barbarous countries the tribe-chief and the war-chief may be found side by side; but when the power of the bow and spear once asserts itself, it is apt to grow further. Throughout history, war gives the bold and able leader a supremacy which may nominally end with the campaign, but which tends to pass into dictatorship for life. Military government in civil affairs is, in fact, despotism; and if the military leader can thus become the tyrant of his own land, still more can he rule with a rod of iron a conquered country. The negro kingdom of Dahome, the result of two centuries of barbaric military rule, is an astounding specimen of what a people will submit to from a despot whom they regard as a kind of deity; they approach him grovelling on all-fours, and throwing dust over their heads; the whole nation are his slaves, whose lives he takes at will; the women are all his, to give or sell; the land is all his, and none owns anything but at his pleasure. The kings of Asiatic nations have been theoretically as absolute as this, but practically in advancing civilization the king makes or sanctions laws which bind himself and his successors, making society more fixed and life more tolerable. Also, as soon as religion becomes a power in the state, it becomes joined or mixed with civil and military government. Thus among negroes the high-priest and war-chief may be the two heads of the government, while the Incas of Peru, as descendants and representatives of the divine sun, ruled their nation with paternal despotism which settled for the people what they should do and eat and wear, and whom they should marry. In such a kingdom royalty must be hereditary in the divine ruling family. Indeed, monarchy, however gained, tends to become hereditary, and especially the military usurper will found a dynasty on the model of a patriarchal chief. Thus sovereignty may be elective, hereditary, military, ecclesiastical, and, difficult as is the history of kingdoms, some combination of these causes can always be traced in them.

The effects of war in consolidating a loosely formed society are described by travellers who have seen a barbaric tribe prepare to invade an enemy or defend their own borders. Provisions and property are brought into

the common stock; the warriors submit their unruly wills to a leader, and private quarrels are sunk in a larger patriotism. Distant clans of kinsfolk come together against the common enemy, and neighbouring tribes with no such natural union make an alliance, their chiefs serving under the orders of a leader chosen by them all. Here are seen in their simplest forms two of the greatest facts in history—the organised army, where the several forces are led by their own captains under a general, and the confederation of tribes, such as in higher civilization brings on political federations of states like those in Greece and Switzerland. Out of such alliances of tribes, when they last beyond the campaign, there arise nations, where often, as in old Mexico, the head of the strongest tribe will become king. Tribes which thus unite are apt to be of common race, speaking kindred dialects, for this is everywhere a natural bond of union; and when they have allied themselves into one people, and come to bear a common name, such as Dorians or Hellenes, they willingly take up the old patriarchal idea, and imagine themselves more closely of one *nation* or "birth" than they really are, even setting up, as we have seen (p. 122), a fictitious as a national ancestor. Events take a different course, but with a somewhat like effect, when some Kafir leader conquers other tribes around, and, setting himself above them all, forces the conquered chiefs to bring him tribute and warriors to fight his battles. This is empire on a small scale and with rude surroundings, but on the same principles as that of a Cæsar or a Napoleon. Thus one understands why in the early history of nations it is so inextricably difficult to make out how far any people have grown up from a single unmixed tribe, or have been built up by alliance and conquest. What shows how this piecing together of nations must have gone on is the number and variety of their gods. While a tribe grows of itself, the names and worship of the same tribe-gods will be a bond of union in all the clans, and even when they move far off they will sometimes go on pilgrimage to the shrines of their old home. But when peoples amalgamate, their different gods are kept up, as when the Peruvians gave places to the gods of conquered tribes under their own great deities. Every district in ancient Egypt shows by its varied combination of gods how many little states and local religions went to make up the great despotism and hierarchy. It was plainly through this growth of nations, which had been going on

we know not how long before history began, that the higher civilization of mankind arose. Scattered families of barbarians in a land where there is still elbow room may thrive without strong government; but when men live in populous nations and crowded cities, there has to be public order. That this political order came out of military order cannot be doubted. War not only put into the hands of the sovereign the power over a whole nation, but his army served as his model on which to organize his nation. It is one of the plainest lessons of history that through military discipline mankind were taught to submit to authority and act in masses under command. Egypt and Babylon, with military system pervading not only the standing army, but the orders of priests and civilians, developed industry and wealth highest in the ancient world, and were the very founders of literature and science. They built up for future ages the framework of government, which we freer moderns of our own will submit ourselves to for our own benefit. A constitutional government, whether called republic or kingdom, is an arrangement by which the nation governs itself by means of the machinery of a military despotism.

As society in tribes and nations became a more complex system, it early began to divide into classes or ranks. If we look for an example of the famous first principle of the United States, "that all men are created equal," we shall in fact scarcely find such equality except among savage hunters and foresters, and by no means always then. The greatest of all divisions, that between freeman and slave, appears as soon as the barbaric warrior spares the life of his enemy when he has him down, and brings him home to drudge for him and till the soil. How low in civilization this begins appears by a slave caste forbidden to bear arms forming part of several of the lower American tribes. How thoroughly slavery was recognized as belonging to old-world society may be seen by the way it formed part of the Hebrew patriarchal system, where the man-servant and maid-servant are reckoned as a man's wealth just before his ox and his ass. It was no less so under Roman law, as is evident from the very word *family*, which at first meant not the children but the slaves (*famulus*). We live in days when the last remains of slavery are disappearing from the higher nations; but though the civilized world has outgrown the ancient institution, the benefits which early society gained from it still remain. It was through slave labour that agri-

culture and industry increased, that wealth accumulated, and leisure was given to priests, scribes, poets, philosophers, to raise the level of men's minds. Out of slavery probably arose the later custom of hired *service*, the very name of which, as derived from *servus*, a slave, tells the story of a great social change. The master at first let out his slaves to work for his profit, and then free men found it to their advantage to work for their own profit, so that there grew up the great wage-earning class whose numbers and influence make so marked a difference between ancient and modern society. In all communities, except the smallest and simplest, the freemen divide themselves into ranks. The old Northmen divided men into three classes, "earls, churls, and thralls," which roughly match what we should now call nobles, freemen, and slaves. Nobles again fall into different orders, especially those who can claim royal blood forming a princely order, and looking down on the chieftains and officers of the army, state, and church who fill the lower ranks of nobility.

As nations become more populous, rich, and intelligent, the machinery of government has to be improved. The old rough-and-ready methods no longer answer, and the division of labour has to be applied to politics. Thus, one of the chief's early duties was to be judge. A Kafir chieftain will make it his business to hear suits between his people; each side brings him a gift of oxen. At higher levels of civilization the Eastern monarch sits in the gate of justice; and it was so among the ancient Germans, where the king sat crowned and gave judgment in his own court. It is still the king's court, but the actual administration has long passed into the hands of professional judges. So with other departments of government. By the time civilization had come to the level of ancient Egypt and Babylon public affairs were administered by officials in grades like an army, who collected the taxes, attended to public works, punished offences, and did justice between man and man. It has just been noticed how far a modern nation is worked by an official system similar to that of the ancients, and how we, really among the freest of peoples, preserve the forms of an absolute monarchy, where sovereign power is administered through servants of the Crown down to the exciseman and constable. In the politics of savages and barbarians, the outlines of the civilized system of government already come into view. We have seen how

among such rude tribes the chief or king appears, who holds his place in some form through higher nations. Even the consul or president of a republic is a kind of temporary elective king. Of not less antiquity is the senate. The old men squatting round the council fire of an Indian tribe on the prairies have in their way a greater influence than a civilized senate, for where there are no written records and books the old men are the very sources and treasuries of wisdom. In the nations of the world, seats at such councils are given to wise old men, priests and officers of high rank, and heads of great families, so that the two terms *senate* and *house of lords* both have their proper meaning, and the two claims of wisdom and rank are more or less combined. With the very beginning of political life appears also the popular assembly. In small tribes the whole community, or at least the freemen, come together. It may be only a forest tribe in Brazil called together by the chief to decide some question of an expedition to net wildfowl or attack a neighbouring tribe, yet solemn form will be observed. There is silence for the orators, and if the assembly approve they will at last cry " good ! " or " be it so ! " More civilized forms of the assembly of the people may be studied in Freeman's comparison of the Achaian *agora* described in the second book of the Iliad, with the " great meeting " held outside London in Edward the Confessor's time. Even in our own day the great meeting of the people has not disappeared from Europe. The wonderful sight is still to be seen of the people of a Swiss canton gathered together in a wide meadow or market-place to vote Yes or No on the great questions which their supreme authority decides. With the growth of nations the folk-moot or assembly of the whole people, never a good deliberative body, soon becomes unmanageable by mere numbers; but there is a way by which its authority may be kept in a less unwieldy form when the people, no longer able to go themselves, send chosen representatives to act for them. This seems a simple device enough, and indeed the first savage tribe that ever sent a discreet orator to negotiate peace or war on its behalf had seized the idea of a political representative. But in fact it is one of the most remarkable points in political history, how the principle of popular representation has been worked out in England from the time of Simon de Montfort's famous parliament in the 13th century. It is for historians to discuss how

the knights and burgesses who came up to grant the king's supplies passed into the lower house of parliament as it is now; what has to be noticed here is the change which, while the huge promiscuous assembly of the people shrank into an aristocratic upper house, gave us a new elective popular body, the *house of commons*. It is not too much to say that no event in English history has had so great an effect in shaping the course of modern civilization. On the whole, looking at what government is coming to among the most enlightened nations, it will be seen that it attains its ends, not so much by casting off the methods of our remote barbaric ancestors, as by improving and regulating them. The administration of the state under the system of sovereign authority, the control of the senate, and the source of political power in the will of the nation itself, are made to work together and restrain one another so as fairly to keep the benefits and neutralize the excesses of all, while the constitution has within it the power of continual reform, so that the machine of government may be ever shaping itself into more perfect fitness to its work.

Here this sketch of Anthropology may close. The examination of man's age on the earth, his bodily structure and varieties of race and language, has led us on to enquire into his intellectual and social history. In his many-sided life there may be clearly traced a development, which, notwithstanding long periods of stoppage and frequent falling back, has on the whole adapted modern civilized man for a far higher and happier career than his ruder ancestors. In this development, the preceding chapters have shown a difference between low and high nations, which it only remains to put before the reader as a practical moral to the tale of civilization. It is true that both among savage and civilized peoples progress in culture takes place, but not under the same conditions. The savage by no means goes through life with the intention of gathering more knowledge and framing better laws than his fathers. On the contrary, his tendency is to consider his ancestors as having handed down to him the perfection of wisdom, which it would be impiety to make the least alteration in. Hence among the lower races there is obstinate resistance to the most desirable reforms, and progress can only force its way with a slowness and difficulty which we of this century can hardly imagine. Looking at the condition of the rude man, it may be seen that his aversion to change

was not always unreasonable, and indeed may often have arisen from a true instinct. With his ignorance of any life but his own, he would be rash to break loose from the old tried machinery of society, to plunge into revolutionary change, which might destroy the present good without putting better in its place. Had the experience of ancient men been larger, they would have seen their way to faster steps in culture. But we civilized moderns have just that wider knowledge which the rude ancients wanted. Acquainted with events and their consequences far and wide over the world, we are able to direct our own course with more confidence toward improvement. In a word, mankind is passing from the age of unconscious to that of conscious progress. Readers who have come thus far need not be told in many words of what the facts must have already brought to their minds—that the study of man and civilization is not only a matter of scientific interest, but at once passes into the practical business of life. We have in it the means of understanding our own lives and our place in the world, vaguely and imperfectly it is true, but at any rate more clearly than any former generation. The knowledge of man's course of life, from the remote past to the present, will not only help us to forecast the future, but may guide us in our duty of leaving the world better than we found it.

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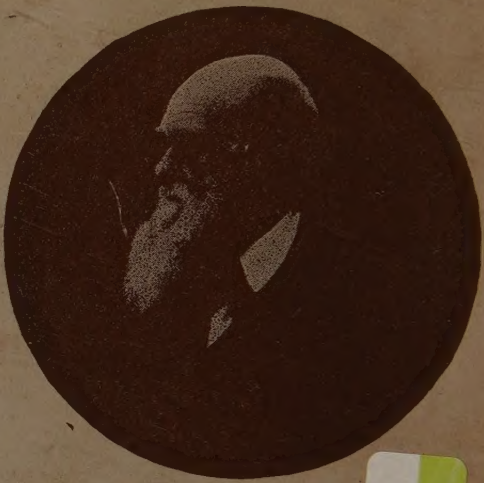

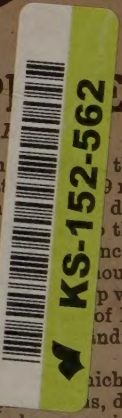

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